LINCOLN/LANCASTER COUNTY
GIS MASTER PLAN

Submitted to:

LLC GIS Committee, GIS Master Plan Project Team
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EXECUTIVE SUMMARY

The City of Lincoln and Lancaster County, Nebraska, have been long-time users of Geographic Information Systems (GIS) and related technologies. A combination of ESRI GIS software products and tools and Bentley CAD products has been used to develop extensive spatial data sets that are routinely used in daily operations. Through interlocal agreements, the City, County, and other public and private entities have collaborated on several projects of mutual interest. The interlocal agreements also established a Geographic Information System Advisory Committee, which provides a loose organizational structure for the GIS program.

While the GIS Committee has set a strong tone for regional cooperation and collaboration, GIS efforts have been primarily agency or departmentally based. In the GIS professional world, this is referred to as "silos of GIS." Recognizing that this departmental approach to GIS results in redundant work efforts and prevents the City and County from maximizing the benefits of GIS, the GIS Committee sought to develop an enterprise GIS program.

Initially, the Committee and several other key stakeholders participated in a visioning session to conceptualize the development of a multi-participant GIS program. Subsequently, another visioning session was held with a broader City and County audience to validate the vision and goals for an enterprise GIS program. As a result of those visioning sessions, the Committee hired PlanGraphics to develop a *GIS Master Plan* that would guide the development of a GIS program for the City, County, the Lower Platte South Natural Resources District, the Lincoln Electric System, and other regional partners as appropriate.

PlanGraphics reviewed documentation developed by ESRI and developed surveys to collect information on the current and anticipated uses of GIS technology and spatial data. Following data collection, PlanGraphics conducted interview sessions with numerous City, County, and other regional entities. This draft *GIS Master Plan* has been developed based upon all of those components. A presentation of the draft *GIS Master Plan* during working sessions with the GIS Committee, participants from the interview sessions, and City and County Executives resulted in additional comments and direction that have also been incorporated into this draft. Following further review by all participants, the draft will be edited and finalized for use by the GIS Committee.

As a part of the project, PlanGraphics was asked to answer and validate several key questions posed by the GIS Committee and to identify a strategic implementation strategy. These questions included:

- "Does the current Enterprise GIS development make sense?"
- Based on the current *Enterprise GIS Vision* document, is the model proposed still feasible?
- "How should such an Enterprise GIS be governed?"
- Does the implementation of a GIS coordinator make sense?
- Does the development of a formal consortium make sense?
- "How should such an Enterprise GIS be funded?"

PlanGraphics' review of the spatial technology needs of the City of Lincoln and Lancaster County validate the need for an enterprise GIS. A *Technical Memorandum* was prepared to describe that validation. The *Technical Memorandum* also presents a recommended organizational structure for the enterprise GIS. This *Technical Memorandum* has been incorporated into this document as Appendix A.

This report presents the overall view of GIS in the City of Lincoln and Lancaster County as it currently stands and an implementation strategy for moving the program from a departmental and project-based approach to a more cost effective enterprise approach. To develop an enterprise GIS, the participants will need to commit to a three-phase development. These phases are:

GIS Enterprise Initiation

During this phase, the organizational components necessary for Program development will be put into place. This includes the update of existing Interlocal agreements, establishment of a GIS Program Management Office, hiring of staff, and development of extended committees. Policies for the Enterprise Program will also be defined during this phase. This phase will also include the design of an enterprise GIS repository.

GIS Enterprise Implementation

During the GIS Enterprise Implementation Phase, participants will focus on the development of a consistent spatial data set, including metadata and streamlined workflows. The first 8 to 14 months will be focused primarily on loading and testing data into the geodatabase and developing consistent data that meets all stakeholder needs for land base features. Training and education will also be a prime goal during that time. Application development and systems integration

may, to some extent, occur coincidentally to data development but will be the primary focus during Program Years 3 and 4.

GIS Enterprise Operations

During the Operations Phase, the City of Lincoln/Lancaster County GIS program will reach a "comfort level" where any new development is absorbed into daily operations. Use of spatial technology is embedded into daily work and is no longer its own entity per se but supports the business of local government, as does any other information technology component such as Microsoft Word or WordPerfect.

SECTION 1
INTRODUCTION

1.1 PROJECT BACKGROUND

Lincoln/Lancaster County, Nebraska, retained PlanGraphics, Inc., an independent geographic information systems (GIS) consulting firm, to develop a *GIS Master Plan*. The strategic *GIS Master Plan* will provide a solid basis for developing consistent standards, sharing data, implementing "best practice" applications, integrating existing systems, realizing Return-On-Investment (ROI), and developing a formal organizational GIS structure that will benefit Lincoln/Lancaster County government, its constituents, and the general economic health of the community.

As part of the *GIS Master Plan* development, PlanGraphics performed data gathering and analysis by—1) obtaining background information, including a previous study performed by ESRI (Environmental Systems Research Institute); 2) distributing survey forms that were filled out in hardcopy and digital format by key participants; and 3) conducting interviews with key departments and agencies. This initial step in the project was to survey and evaluate geographic information systems existing within each project participant's office and to identify business processes and workflows.

The importance of involving a broad scope of departmental/agency activities is critical at the initiation of a GIS planning project to better determine requirements and potential applications for implementing an efficient and effective system.

The departments and individuals that participated in master planning interviews are listed below.

Table 1-1: Master Plan Participants

Department/Agency	Name
Airport	Jon Large
Building and Safety	Terry Kathe Michael Merwick Chuck Zimmerman Wilma McCamley
County Assessor/Register of Deeds	Doug Guess Eric Hubl Rob Ogden Scott Richert Norman Agena
County Engineer	Jim Langtry Don Thomas Larry Worrell Scott Robinson
County Sheriff	Todd Duncan
Finance	Don Herz

Table 1-1: Master Plan Participants (continued)

Department/Agency	Name
Finance/Communications Center (911)	Dennis Roth Julie Righter Tara Garza
Finance/Information Services	Doug Thomas Jim Anderson
Fire	John Huff
Health	Jim Platt Kathy Cook Steve Frederick
Lincoln City Libraries	Carol Connor
Lincoln Electric System	Mike Murphy David Miller Kevin Hoops Dan Pudenz
Lincoln Public Schools	Eric Kinghorn Ryan Axmann Duane Smid
Lower Platte South Natural Resources District (LPSNRD)	Anna Stambaugh Shaula Ross Glenn Johnson
Parks and Recreation	J.J. Yokes
Planning	Kent Morgan Missy Minner Alan Griffin Cindy Dittman Logan Christie Marvin Krout
Police	Tom Casady
Public Building Commission/Property Management	Don Killeen
Public Works/Utilities	Arnold Radloff Deborah Byrne Frank Larson Gary Thalken Nick McElvain Shannon Ideus Stephen Titus Tim Pratt Amy Zoller Mark Fischer Margaret Remmenga
Urban Development	Maggie Aldrich Pat Posey-Ribeiro
Weed Control Authority	Russell Shultz

1.2 REPORT PURPOSE AND ORGANIZATION

The purpose of this report is to document the current GIS uses in the City of Lincoln and Lancaster County and identify a strategy for implementing an enterprise GIS program. More specifically, this report documents the following objectives:

- Describes the current and future responsibilities and activities of individual departments
- Reports on existing automated and manual data records and maps
- Suggests how GIS technology may be applied among the participating departments
- Provides a conceptual design for the enterprise GIS
- Recommends an implementation strategy for GIS.

Six sections are included in this report:

- Section 1—Briefly introduces the project and presents a list of department participants.
- Section 2—Describes the roles and responsibilities of departments, as well as workflows within and between departments.
- Section 3—Provides an overview of current information systems and geographic information. Inventories of all maps and data sets used by the departments are also presented.
- Section 4—Provides a conceptual design for the enterprise GIS program.
- Section 5—Provides a strategic implementation strategy.
- Section 6—Provides a benefits summary and explores current limitations and potential barriers for a GIS within the County.

SECTION 2
CURRENT GIS ASSESSMENT

2.1 DEPARTMENTAL SUMMARIES

Figures 2-1 and 2-2 provide the organizational charts for Lincoln/Lancaster County. Twenty-one departments were interviewed during the on-site visit March 1–4, 2005. Departments and agencies highlighted in yellow in the following charts were interviewed during this process.

Figure 2-1: Lancaster County Organizational Chart

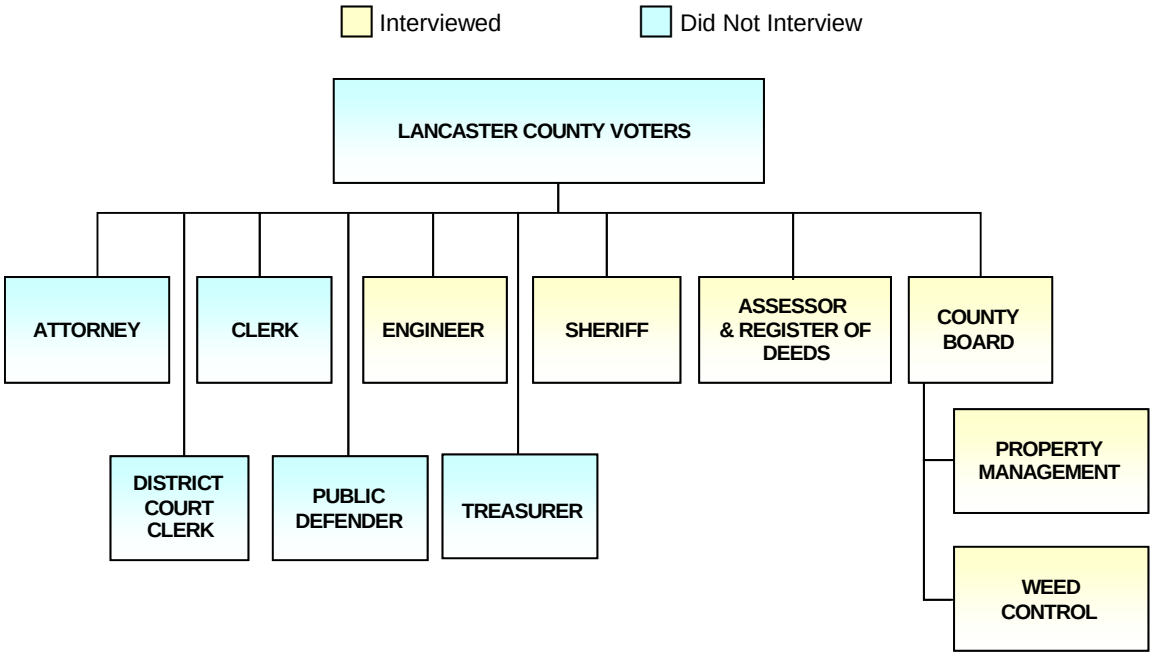
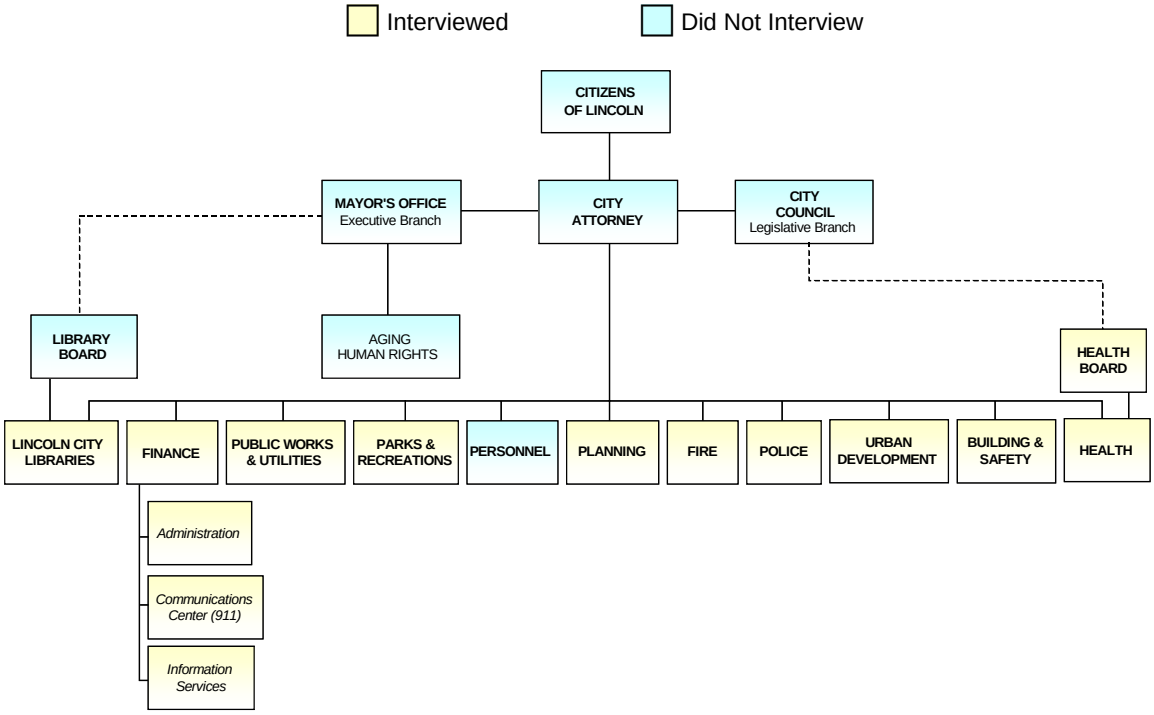


Figure 2-2: City of Lincoln Organizational Chart



2.1.1 Airport Authority

Function and Activities

The Lincoln Airport is located in the northwest corner of the City. It serves central and southeastern Nebraska. The Airport Authority is its own political entity by Nebraska statute. The Airport started out as an Army airfield during WWII, but the land has since been transferred to the City.

Importance of Geographic Information

As part of FAA Part 150 compliance, the Airport Authority hired an engineering consulting firm to perform noise analysis and related contours. The Airport has worked with City/County Planning to publish those noise contours for the public. The Airport also utilizes AutoCAD to manage its most recently developed spatial data, including construction, pavement, buildings, and utilities. Other facilities information is documented on hardcopy maps. Facilities management is also accomplished through the use of field units (PDAs) where locations such as cracked pavement are noted with a corresponding GPS location. The Airport acquires aerial photography every year, as well as accesses satellite imagery when needed.

The Airport has identified several GIS application requirements, including complaint tracking, support of pavement management, public notifications, tracking aviation easements, and supporting security measures. This includes logging and mapping

"contact" locations where there has been some type of security issue or event. This would allow the Airport to identify any trends.

One of the challenges that the Airport Authority faces is that historically it has developed or paid for the development of databases that were not maintained. Any future GIS development would need to consider existing workflows to ensure that spatial data sets can be maintained easily and without disruption of work.

2.1.2 Building and Safety Department

Function and Activities

The Building and Safety Department ensures the health, fire, and housing safety of all buildings within the City. Building activities that the department performs are issuing building permits, and special permits for exceptional use, performing plan review, and determining compliance with zoning, including inspection and compliance of signs. Inspections and enforcements that are performed by the department include building, electrical, mechanical, plumbing, and housing (for rental units). The department also performs fire and arson investigations, inspections, and bomb squad activities through the Bureau of Fire Prevention. The department issues special permits, requiring council action to allow exceptional use on a property, and listens to appeals to the Board of Zoning Appeals for zoning exemptions and adjustments.

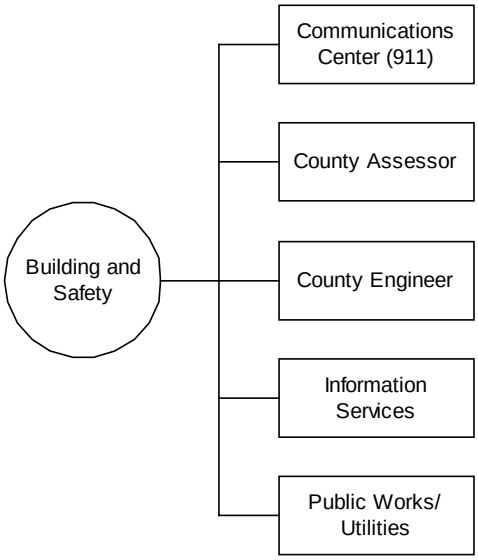
The zoning coordinator assigns addresses for new development within the County. The coordinator assesses the preliminary plats to determine an addressing schema. After the Council accepts a final plat, address points are entered into the GIS as a point on the building structure, and the plat is transferred to PWU for archiving and distribution. Addressing information is also provided to the Post Office at this point. Permits are then issued from the address point file using the Department's Permits Plus program. The County engineer in coordination with the Building and Safety Department is currently performing readdressing within the County outside of the extra-territorial jurisdiction (ETJ).

Importance of Geographic Information

The Building and Safety Department utilizes GIS maps and data to assist in determining zoning compliance, as well as to assign addresses. Data utilized within the Department include zoning, building, floodplain, road, easement, airport information, property, and aerial photography. The Department also utilizes the ArcIMS Web site for finding "quick answers" on zoning ordinances.

Interactions

Data interactions are depicted in the following figure.



2.1.3 County Assessor/Register of Deeds

Function and Activities

The County Assessor/Register of Deeds Office maintains information on all sales of real property within the County, as well as provides market values for all real property. The Office reviews exemptions and preserves legal documents such as deeds, mortgages, releases, decrees, and wills. Staff within the office consists of professional appraisers and professional support staff, including three GIS technical staff.

The Office maintains information on approximately 100,000 parcels, including 200 residential neighborhoods; 6,000 commercial; 75,000 residential; and 21,000 agricultural properties. The assessment data is currently stored in mainframe software (OASIS). However, the Office is moving to ORION by Tyler Technologies, which will allow the data to be stored in an SQL Server database. The data should go live in the April-May time frame, with live data and maps in June.

The Office receives final plats, records them, and passes the assigned parcel identification number to the Building and Safety Department so that addresses can be assigned. The new software that the Office will be utilizing will need to integrate with the Permits Plus package that the Building and Safety Department uses so that the parcel information can be transferred between the two packages.

Importance of Geographic Information

The Office maintains cadastral data consisting of 864 individual sectional coverages, which represent parcel ownership within the County (see Figure 2-3). The sectional coverages are appended to provide a countywide property layer and joined with ownership information for distribution in shapefile format.

The GIS utilized within the Office operates over a LAN. The GIS has improved cadastral mapping within the office and has assisted with determining market values and equalization. The Office has also established a GIS capability that makes much of the information regarding properties available on-line to the public through an ArcIMS Web site and general searches. The on-line tools available to the public include property information, maps of properties, and deed searches. These tools allow the public to readily obtain extensive information on properties. However, data on the ArcIMS Web site and within the OASIS package are out of sync by one month, which will be resolved with the implementation of the ORION package.

The office utilizes custom Visual Basic (VB) forms and ArcInfo AMLs (Arc Macro Language) to perform many tasks, including COGO of parcel boundaries and addition of attributes. The AMLs number more than 70, but not all are currently used.

Several concerns that the Office has regarding migration to the ESRI geodatabase environment include the lack of double precision in the geodatabase, spatial accuracy when compared with the localized projection that the County utilizes, and the number of add-on extensions that may be required. Another concern for the office is the integration of workflows between the different departments, especially in how this affects the cadastral maps and the assignment of addresses. Several different address point files are available to the departments, causing the need for one source for addresses (i.e., Building and Safety) and the need for these files to be verified.

Another issue is land base compatibility. The City developed its files in MicroStation and converted them to coverages, while the County developed its files in ArcInfo. Both used different spatial standards for placement. As a result, the two sets of files do not match.

Interactions

Data interactions are depicted in the following figure.

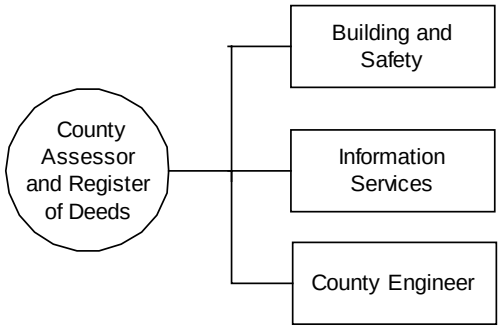
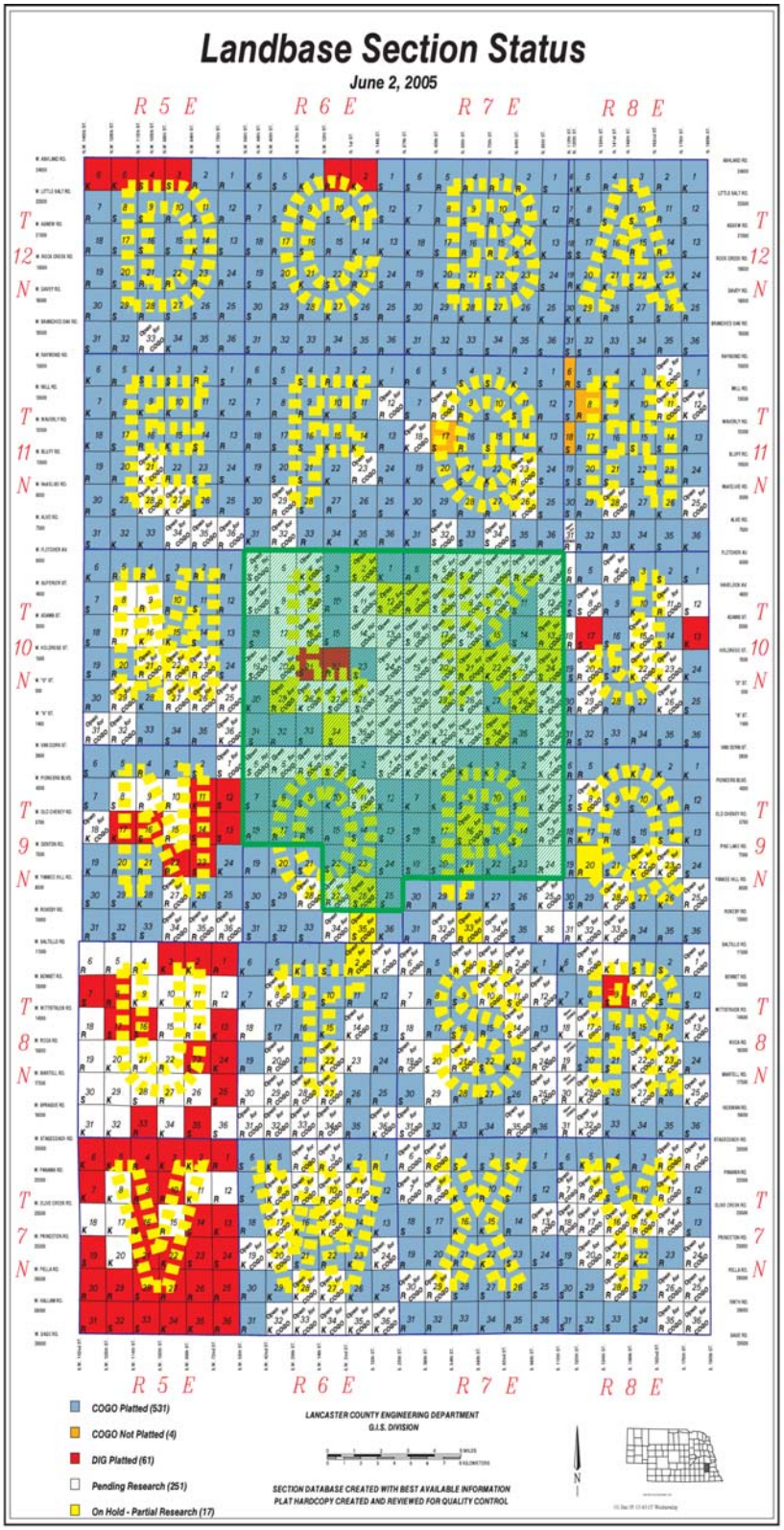


Figure 2-3: Parcel Map



2.1.4 County Engineer

Function and Activities

The County Engineer's Office designs, constructs, inspects, maintains, and repairs County roads, streets, and bridges. Road and bridge improvements are included in the Office's one- and six-year improvement program for that purpose. Through the County surveyor, cadastral plat maps of legal lots are created and maintained through the use of land surveys, subdivisions, and deeds. Proposed platted land subdivisions and access requests are also reviewed. Currently, the Office has approximately a one-year backlog for the entry of land base information. The GIS Division within the Office has three full-time staff.

On the Lincoln/Lancaster County Internet Web site, the Office maintains a list of street closings for the public, as well as static road and parcel maps. The Office also maintains a public FTP site with access to survey records, field notes, and plat book information that is on file in that Office.

Importance of Geographic Information

The Office considers base control critical to establishing the section and quarter corners for any surveys conducted. Most corners have been researched and established through the use of GPS to the local coordinate grid within the County, excluding the City of Lincoln. Survey accuracy of less than .03 feet has been established for these control points. However, the Office currently has two sources for its plat maps—COGO (Coordinate Geometry) and digitized—that are being evaluated and entered into the system.

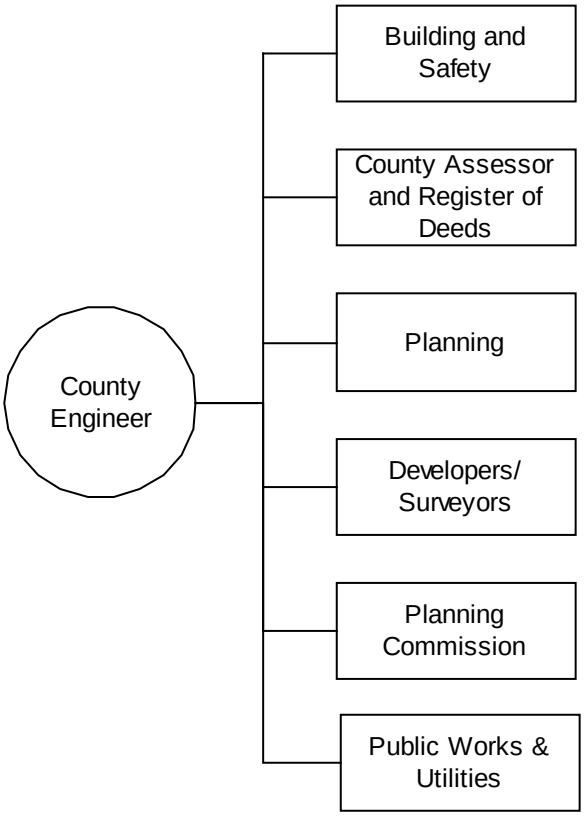
One dilemma that the Office faces is the need to perform Quality Assurance (QA) and Quality Control (QC) on developer plats and deeds that are submitted, leading to the need for requesting correction of information before entering the changes on the plats by the Office. This is also an issue in the Public Works Department, and more streamlined workflows are under discussion for re-engineering. All preliminary plats are checked for items such as size, accuracy, and drainage and sent to the Planning Commission for review.

The County is subdivided into four districts for road maintenance. A color-coded traffic count map is used for maintenance work and tree removal within the four districts. The Office also employs Cartegraph for sign, culvert, and bridge management.

The Office receives daily requests for specialty maps from other agencies and the public, leading to the creation of Visual Basic applications to help in this process.

Interactions

Data interactions are depicted in the following figure.



2.1.5 County Sheriff

Function and Activities

The County Sheriff's Office is responsible for records processing, extraditing wanted persons, serving court documents, collecting delinquent taxes, executing writs, performing criminal investigations, responding to calls for service, providing security to government buildings and courtrooms, transporting prisoners, and motor vehicle inspection of out-of-state and salvage titles.

Importance of Geographic Information

The Sheriff's Office maps calls for service, which are imported and geocoded daily by the Office. The Office also records traffic accidents, which are reported to the State. Mapping of hazardous materials is also done within the Office. This information comes from the Health Department.

The primary use of GIS within the Office is for crime analysis. An example of its use is the plotting of burglaries where GIS assists with the identification of pattern characteristics. Using CrimeView Community, crime maps are also distributed on the Internet to the public.

The Sheriff's Office would also like to serve GIS data to the mobile data terminals in the cruisers. However, that poses challenges due to the lack of bandwidth of the 800 MHz radio communications allocated for that purpose.

2.1.6 Finance—Administration

Function and Activities

The Finance Department performs fiscal management for the City, as well as maintains City records. Divisions within the Department include Accounting, Budget, City Clerk, City Treasurer, Communications Center (911), Information Services, and Purchasing, which report to the Finance Director. GASB34 was implemented within the Department years ago; and, the Department maintains a list of the City's assets, including records from other departments such as Public Works and Utilities.

Importance of Geographic Information

The Administration Department does not utilize GIS in its activities but does maintain several systems that contain spatial information, such as customer information for billing and permits. GIS functions that would benefit the Department include capturing invoices digitally; performing revenue/tax analysis by parts of the City; performing expenditure analysis; performing neighborhood analysis such as street and sidewalk conditions; and assessing parking ticket violation locations.

2.1.7 Finance—Communications Center (911)

Function and Activities

The Communications Center receives calls and dispatches for Police, Sheriff, Fire, and Medical emergencies. The Center is responsible for the City of Lincoln and Lancaster County and provides service to the surrounding area through mutual aid. The Center also has an incident dispatch team made up of six staff placed at the scene in the command control when necessary.

Importance of Geographic Information

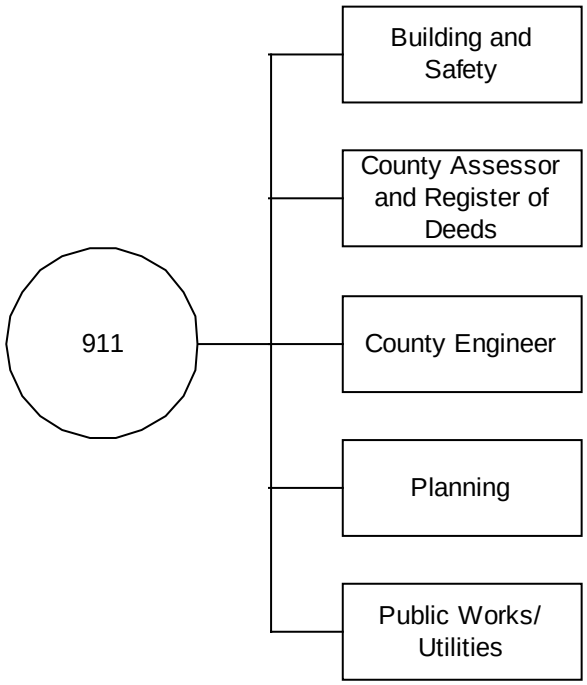
The Center receives a preliminary plat for review from the City Planning Department. The Center assigns temporary addresses to the plat in order to be able to dispatch emergency services before the final plat is approved. The Center updates its street file weekly by comparing its file with street and parcel files located on the shared M-drive. The Center's street file includes alleys and private streets and drives that are not in the

main street file published by the Planning Department. However, these features are needed for dispatch purposes. The parcel file is copied monthly from the shared drive.

The Center also utilizes many GIS layers in its CAD map program, which plots a point on the map based on the ANI/ALI of the call. These files include aerial photos, fire zones, ESN zones, hydrants, buildings, parcel boundaries, trails, railroads, and streets. Paper maps are used as a backup and for mobile purposes.

Interactions

Data interactions are depicted in the following figure.



2.1.8 Finance—Information Services

Function and Activities

The Information Services Division is a joint City and County agency. The Division provides computer and network support to the participating agencies on a fee-based schedule. The Division provides back office support, system development, ArcIMS development, and software and hardware procurement and support.

The Division maintains the Oracle, ArcIMS, and ArcSDE servers and software for the City and County, which it is responsible for the agreed upon maintenance. The Division is also responsible for IBM 390 and AS400 systems. There are 30 fiber locations within the County and 60 DSL. Wireless locations also exist utilizing point-to-point infrastructure, infrared, and hotspots.

Importance of Geographic Information

The Division developed ArcIMS Web sites for the City/County Internet site that include: Services by Location; Street Finder; Interactive Crime Map; Interactive Special Permits Map; Floodplain and Flood Prone Areas; Lancaster County Voting Precincts; Comprehensive Plan; Noxious Weed Infestations; Property Information; Wilderness Park Environment; and Zoning. The Division stores data for the Web sites in Oracle and ArcSDE, including creating a mosaic of aerial imagery in ArcSDE.

2.1.9 Fire

Function and Activities

The Fire and Rescue Department provides fire prevention, fire control, fire emergency medical services, and public education services to the City of Lincoln. The Department also provides EMS ambulance service to the County and parts of six surrounding counties, as well as ambulance billing through a contractor. The Department supplies the County with hazardous material technician-level services, utilizing mobile and portable decontamination systems. The Department also performs search and rescue. The Department has mutual aid agreements with 17 rural fire districts. The Department is equipped with 14 stations and 18 engines.

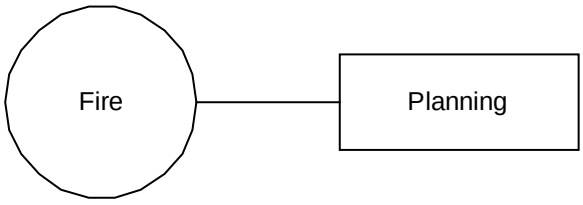
Importance of Geographic Information

The Department utilizes FireView, a front end to ESRI's ArcView software, to run analysis for planning and to plot calls. The Department obtains building floor plans and site plans for pre-fire incident plans. Hard copy maps for natural gas and hydrants are also utilized. Within the Department, three people are equipped to perform GIS analysis.

Several informational needs for GIS that the Department has include education; exposure analysis; station location planning; hazmat and detailed building information linkage; AVL; GPS; determining critical infrastructure; displaying hydrant capacity, pressure, and in/out service; obtaining preliminary plats with streets and hydrants; and obtaining population demographics.

Interactions

Data interactions are depicted in the following figure.



2.1.10 Health

Function and Activities

The Health Department is a joint City of Lincoln and Lancaster County agency. The department has several divisions to ensure environmental and personal health—Animal Control; Community Health Services; Dental Health and Nutrition Services; Environmental Public Health; Health Data and Evaluation; Health Promotion and Outreach; and, Information and Fiscal Management.

The department has 10 core users of GIS, along with a GIS coordinator. The GIS coordinator and the information manager work together to determine the necessary applications needed for the Department. One FTE is spent on developing and coordinating the tools used in the GIS applications and for the ArcIMS Web site that the Department hosts.

Importance of Geographic Information

The Department uses GIS to analyze health data, identify spatial patterns, quickly retrieve information, overlay information, and model disease and environmental events. Some of the community and program assessment projects, to name a few, that the Department has are Key Geographic Public Health Indicators; Mobile Health Clinic Planning; Shigella and Pertussis Outbreak data; Natality Data Analysis; WIC Program—Client and Community Needs Data; Animal Control Dispatch Planning; and Childhood Lead Poisoning Screening. The Department is also involved in national, state, local, and educational presentations of GIS information.

The Department has established data standards when obtaining and distributing data, including the creation of metadata. The Department has three basic types of databases—1) reference (static data in electronic and hard copy data), 2) service contact/counter (dynamic service data), and 3) surveillance/outbreak (ad hoc data). The reference and service data are cataloged with field layouts and layer definitions. The Department utilizes approximately 300 to 400 data layers.

Vital statistics is a large component of the Department's data utilization. This data is currently being moved to an SQL Server database. In addition, addresses are a major data requirement for the Department. The Department uses both the physical and mailing addresses of individuals. The Department has found that there is a lack of consistency in address entry and validation, especially when such divisions as Animal Control and the Health Response Team need inexact addresses, intersections, and alleys.

The Department maintains non-GIS databases for medical providers, health centers, physicians, special waste, complaints, health client information, environmental health, and animal control stored in MS Access and DB2. Flat files, such as for birth and death data, are also utilized within the Department along with SPSS for analysis.

The Department shares some of the data that it collects and produces without outside agencies and partners, in the City and County. The Department has set up data sharing rules for just this purpose, including limiting the amount of client information that can be shared.

Mobile devices are utilized within the Department. The Animal Control Division utilizes wireless palm handheld devices to access information needed in the field, such as licensing information, codes, and property ownership, as well as digital cameras. The Health Response Team is equipped with GIS capability, including hardware and software, when responding to an incident.

GIS hardware and software within the Department is funded through grants. Other GIS expenses, such are maintenance fees, are budgeted by the Department. The department hosts its own internal ArcIMS Web site, maintaining its own server to accomplish this, as well as provides access to Census maps and data to the public. The internal ArcIMS Web site allows staff to quickly develop GIS maps without extensive training, allowing them to become self-sufficient.

A GIS goal that the Department has is to build tools for staff access and use of data. These tools would allow for basic data to be accessed, simple interfaces, reporting functions, and limited training. Other goals that the Department has are to have address standards for data entry, to use GIS as a tool for epidemiological analysis, to create more health-related layers to use in analysis, and to use GIS for special projects, such as determining kennel service locations.

2.1.11 Lincoln City Libraries

Function and Activities

The Lincoln City Libraries provide service to the City of Lincoln, including reference materials, periodicals, interlibrary loan, youth services, tapes and discs, videocassettes, Polly Music Library, and Heritage Room. The Library provides general-use computers for patrons, including quick check computers and lab computers. Twenty of the computers have Internet access, and six have word processing software. The Library also has access to more than a dozen informational databases.

The Library has a 3 million annual circulation and utilizes an automated library system. Outreach work is done in the community, including a book mobile, a summer reading program, and Primetime—a storytelling event in Spanish for children and their parents.

2.1.12 Lincoln Electric System

Function and Activities

The Lincoln Electric System (LES), a publicly owned utility, provides power for the residents and businesses in the City of Lincoln and surrounding area. LES generates, purchases, transmits, and distributes electricity to its more than 105,000 residential customers and 15,000 commercial/industrial customers.

Importance of Geographic Information

LES uses GIS for the following activities—outage restoration, planning, assets tracking, underground line locates, maintenance, troubleshooting, customer response, engineering analysis and design, locating easements, environmental impact studies, land use studies, and floodplain mapping. LES primarily uses the County Assessor's data. The company has contributed to aerial photo acquisition and development of the land base, which is one of its priorities.

LES maintains City streetlights but lacks sufficient street lighting data from the City. LES also obtains preliminary and final plats and is involved in the plat approval process, dealing directly with developers.

LES performs a variety of public service activities, such as determining general areas and levels of destruction during emergencies, proposed reconstruction after disasters, providing first aid, assisting the Red Cross, and assisting with road blockages.

2.1.13 Lincoln Public Schools

Function and Activities

The Lincoln Public School system has more than 32,000 students in it 54 schools. It has a facility inventory of nearly 5 million square feet that it must manage.

Importance of Geographic Information

Lincoln Public Schools uses a number of spatial data sets in its management and operations. Street centerlines are enhanced and used for bus routing using Edulog software. Speed limits and one-way street attribution are taken from the City's centerline data. Construction work can also be entered into Edulog for re-routing as necessary. Edulog also has a Web-deployable viewing tool that the schools are hoping to deploy to show bus routing. The school system has purchased ArcIMS to support this as well and is working with the Information Services Division to get it configured.

Besides busing, Lincoln Public Schools uses ArcView 3.x for a variety of other spatial analyses and mapping functions. They have a geocoded file for all students that they use for transportation, decisions on boundaries, funding, and other land demographics. As new developments are constructed, they use special map products to illustrate busing or

other constraints. They also generate maps for the YMCA to show where all their facilities, such as ballfields, are.

Currently they prepare all of their facilities mapping using MicroStation. Police officers that are assigned to the schools keep hardcopy map books of these facility drawings.

2.1.14 Lower Platte South Natural Resources District

Function and Activities

The Lower Platte South Natural Resources District (LPSNRD) is a local subdivision of the State of Nebraska government, charged with soil and water management, development, and protection. A director from each subdistrict sits on the LPSNRD Board of Directors. LPSNRD collaborates with farmers, landowners, and the City and County. LPSNRD covers most of Lancaster County and parts of adjacent counties. LPSNRD also participates in the Lower Platte River Corridor Alliance, which is responsible for the protection of resources of the Lower Platte.

LPSNRD's main activities include flood control, soil conservation, groundwater management, forestry and tree planting, recreation and wildlife, urban conservation, and environmental education.

Importance of Geographic Information

LPSNRD has 25 employees, including one GIS specialist. Most of the employees use GIS for analysis, or they access and view GIS data through ArcPublisher.

LPSNRD has contributed to the purchase of County aerial photos and LIDAR data. The agency also has access to the shared GIS drive. LPSNRD obtains data on projects as it is needed. The agency utilizes SQL Server and has implemented a personal geodatabase. Some of the data sets that the agency uses are wells, wetlands, and construction information.

2.1.15 Parks and Recreation

Function and Activities

The Parks and Recreation Department provides and maintains parks and green spaces for the City of Lincoln, offering recreational activities and facilities as well. The Parks Division maintains 80 (or 99?) miles of trails, 106 parks, 11 outdoor pools, 8 recreation centers, 2 dog run parks, and 100,000+ trees. Other divisions within the Department include Recreation, Outdoor Education and Greenways, and Golf and Athletics.

The Department is heavily involved in grant writing, park planning, and facility management. The City is divided into four quadrants for maintenance. The Community Action Program (CAP) allows citizens to submit grants to improve the parks—the citizen supplies the labor, and the Department supplies the materials. The Department collaborates with the Parks and Recreation Foundation, a separate entity that provides improvements to parks. The Department is also involved in the subdivision/plat review process.

Importance of Geographic Information

The Department utilizes ArcView 3.2 to create presentations, maps, and mailing lists. AutoCAD and MicroStation are employed for park planning. A license of MicroStation is accessed from PWU. The Department has a DSL line, so moving files from PWU is very slow. The Department has access to the shared GIS drive and utilizes the ArcIMS Web sites for mapping and planning purposes.

The City of Lincoln Planning Department has mapped all of the parks, including open spaces. The Parks and Recreation Department has several databases that have a spatial component, including an MS Access database of park facilities (trails, drinking fountains, swimming pools, recreation centers, ball fields, picnic areas, playgrounds, tennis courts, and park benches), memorials and donations (name and cost), Adopt-a-Trail, and Adopt-a-Park. Other databases include tree counts, rental shelters, and Census data (used for budget and financing).

Paper work orders are used for facility management, which are subsequently loaded into an MS Excel spreadsheet for record purposes. One avenue that the Department sees for GIS is an interactive park map with information for the public and employees to access. Linkages to digital photos and GPS are also areas that the Department sees as advantageous. A last area that the Department can benefit from is the utilization of GIS to market parks to the public, including creating mailing lists for golf courses and Adopt-a-Trail and Adopt-a-Park programs.

2.1.16 Planning

Function and Activities

The City of Lincoln Planning Department is responsible for land development planning within the City and County, except for the incorporated towns and villages. The Department prepares comprehensive plans, which guide land development and infrastructure improvements. The Department also deals with changes of zoning, use permits, and special permits and performs transportation modeling and environmental planning. Within the Department, there are four full-time GIS staff.

Importance of Geographic Information

The Department considers GIS technology extremely important to its functions, especially when dealing with geographic-based policies and issues. One example of this is the more than 70 maps used in the comprehensive plan document. Applications for land development require analysis using geographic information, including existing and future land use, topography, infrastructure, environmental conditions, zoning, etc.

One issue that the Department faces is the lack of a single land base from which to work. The City Public Works and Utilities and the County engineer land base information is created differently, causing some boundary problems between the City and County. In addition, how the right-of-way is represented between the two entities is different as well as codes that are used. These issues are being reviewed before migrating to the geodatabase.

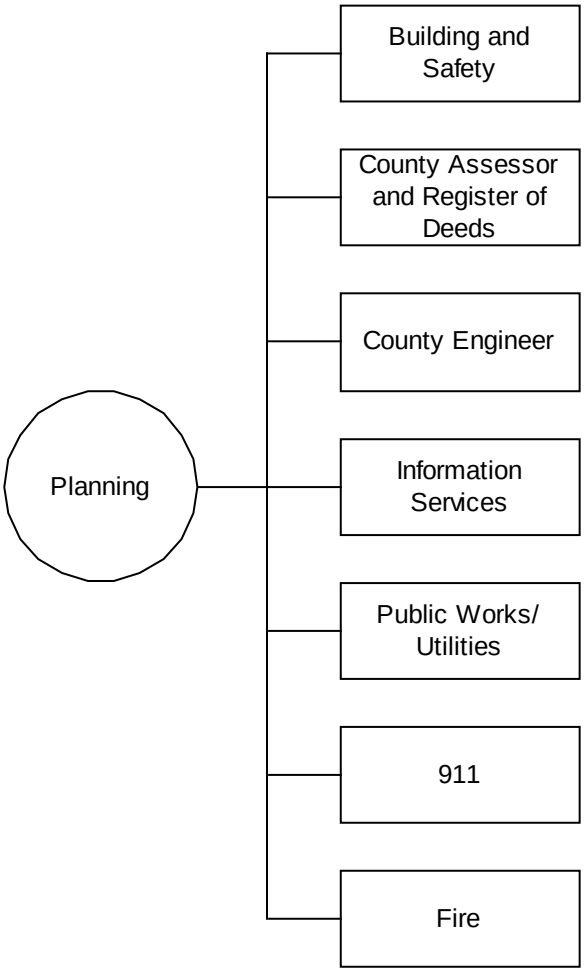
The Planning Department is responsible for keeping the street centerline layer up-to-date. The file was originally from TIGER/DIME files and conflated with address ranges by ESRI. The layer is used extensively in the City, and specifically distributed to the Police Department and school system. After a final plat has been approved, the street is officially drawn in. However, preliminary plats are needed, especially in cases of emergencies.

The Department also maintains the railroad layer for the City. Other data that the Department utilizes is address data from the Building and Safety Department; building footprints from the County Assessor/Register of Deeds; bikeways; pedestrian walkways; airport data (noise study, elevation for approach zones); and wetlands information. Additional information that would benefit the Department includes easements, utility information, and digital submissions of final plats.

The Department supplies data to several ArcIMS Web sites located on the City/County Internet site—Comprehensive Plan; Floodplain and Flood Prone Areas; Natural Resources GIS; Special Permits; Voting Precincts; Wilderness Park; and Zoning.

Interactions

Data interactions are depicted in the following figure.



2.1.17 Police

Function and Activities

The Police Department provides safety to the citizens in the City of Lincoln. In the course of that work, the Department performs crime mapping and analysis using CrimeView. The Department's record management system is maintained internally, with some hardware and operating system support from Information Services.

Importance of Geographic Information

The Department has six GIS power users, along with the chief of Police who spends a couple of hours a day using GIS technology. GIS competency even factors into the criteria for promotions. Comprehensive in-house training is provided to personnel, as well as training on CrimeView Web. CrimeView Web is used internally to serve data

throughout the Police force. CrimeView Community serves data to the public through the City/County Internet site using an interactive crime map. Base data that the Department utilizes comes from the City and County and is manipulated to meet the Department's specific requirements. The department has access to several data layers—political boundaries, parcels, school attendance, transportation, parks, schools, school footprints, and zoning districts.

The Department has created its own centerline file, since it has its own specific needs for its use. Geocoding is done to point and range information, and aliases are setup in the database.

Mobile computers that the Department uses have a resident viewer from TutukGIS, a GIS software company in Poland. The viewer provides fast and easy access and query of aerials and basic geography, schools, and other data that the Department has access to. The Department employs hyperlinks to aerial photos from features within the software.

2.1.18 Property Management

Function and Activities

The Property Management agency performs real estate management, including issuing bonds, managing City/County buildings and properties, performing facility management, and handling the leasing of City/County land to farmers.

Importance of Geographic Information

The agency accesses the County Assessor/Register of Deeds ArcIMS Web site to determine property values. The agency tracks utility data for budgetary purposes on future projects. The agency also accesses hard copy underground service maps.

A requirement of the agency is an inventory of City- and County-owned properties, identifying the department that is responsible for the building or lot. A facilities management application would be beneficial to this department. In addition, the agency requires that the right-of-way be distinguished within the land base, not represented as one polygon feature.

2.1.19 Public Works/Utilities

Function and Activities

The City of Lincoln Public Works and Utilities Department finances, designs, constructs, operates, and maintains services related to municipal water, waste disposal, drainage, and transportation systems. The Business Office Division provides services for the collection of impact fees, public parking, water and sewer customer service, meter reading, and billing. The StarTran Division provides a public mass transit system. The Wastewater/Solid Waste Division is responsible for collection, treatment, landfill, and

recycling operations. The Water Production and Distribution Division is responsible for water distribution and water quality, including system maintenance, and treatment. The Division manages all one-call requests received by the Department. The Watershed Management Division assists with improving water quality, managing stormwater, and reducing flood hazards within the City through education, water quality testing, enforcement of standards, and capital projects.

The Engineering Services Division consists of the following sections:

- Comprehensive Engineering Information Systems Section—Deals with archived records, maps, GIS, application development, and training and support.

- Design/Construction Section—Responsible for City projects, bidding schedule, ROW agreements, construction (street closings), standards, surveying, pavement, and bridge inspections.

- Long-term Planning Section—Provides planning for 20-year road plans, comprehensive plans, special projects, CIP/TIP budgets, and traffic impact studies.

- Development Services Section—Performs plat review, annexation agreements, building permit review, street vacations, executive orders for construction of public facilities, parking lot design standard compliance, and special assessment districts.

- Traffic Operations Section—Responsible for parking meters, sidewalks, pavement markings, over-dimensional permits, complaints/sight obstructions, traffic volume counts, barricading, school traffic information, sight distance standards, special events, street name signs, traffic cameras, signals, signs, studies and evaluations, and trails.

- Street Maintenance Section—Responsible for snow and ice removal, street and stormwater services, and street sweeping.

- Metropolitan Planning Organization—Reviews transportation issues and develops transportation plans and programs.

Importance of Geographic Information

The Department utilizes GIS daily in its activities. The Department preserves records for all water, storm sewer, sanitary sewer, paving, traffic signals, utility locations, and design data in hardcopy and MicroStation format. A database manages and stores sidewalk inspection data. Records Management is responsible for entering and maintaining an archive of construction drawings, including the addition of land base information by redrawing plats in MicroStation format using hardcopy maps. The MicroStation files are extracted and supplied to consultants as needed.

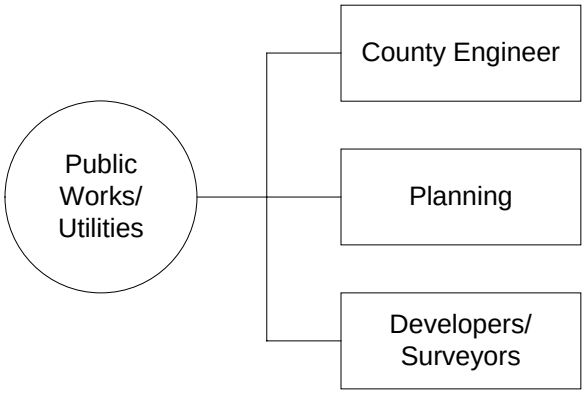
Several data issues that the Department faces in its work are—1) section corners are being re-evaluated by the County engineer, causing some misalignment and edgematching problems that are not always known to the Department; also, if the section corners are moved less than five feet, PW&U does not redraw the four sections related to that corner; 2) manholes break sewer lines on the drawing file; and 3) street centerline segments are broken at boundaries, not intersection to intersection. As a result, this centerline file cannot be used for network analysis.

Asset information is maintained in several different kinds of programs, including Hansen, spreadsheets, Lotus123, RBASE, and MS Access, with and without direct links to the GIS layers. In addition, several other databases that the Department maintains do not have a link to the GIS layers, such as customer service information.

The Department supplies some information to the City's ArcIMS Web site, including information on impact fees and parking lots.

Interactions

Data interactions are depicted in the following figure.



2.1.20 Urban Development

Function and Activities

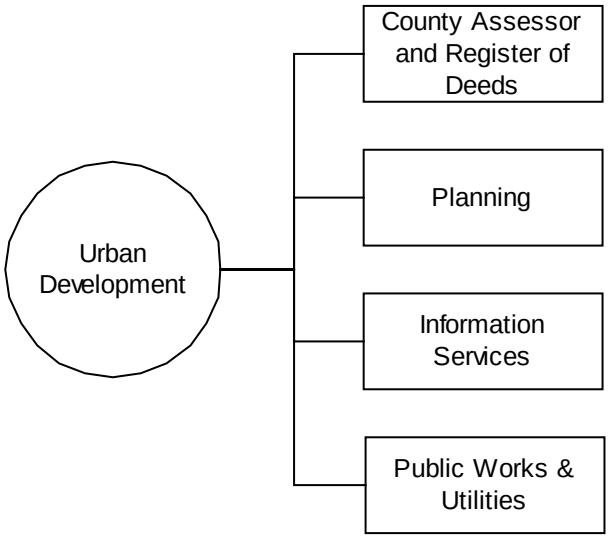
The City of Lincoln Urban Development Department provides revitalization and maintenance of low- and moderate-income communities. The Department has approximately 30 employees within its four divisions—1) Community Development; 2) Housing and Real Estate; 3) Workforce Investment Administration; and 4) Workface Investment Program. The Community Development Division is responsible for providing financial and technical assistance to the community. The Housing and Real Estate Division provides housing rehabilitation through home improvement loans, emergency repair loans, and home loans and provides relocation assistance. The Workforce Investment Administration and Program deal with providing workforce development opportunities, such as career counseling, adult and youth services, and training assistance.

Importance of Geographic Information

One staff member within the Department works with GIS. Data sets that the Department uses are created for individual projects. Some specific data sets that the Department utilizes are County Assessor parcel data and census information. The Department is responsible for the creation and maintenance of data, including Low to Moderate Income Areas, Neighborhood Boundaries, Focus, Blight, and TIF areas, as well as Redevelopment Project Areas. The Department has an internal ArcIMS Web site that is available to a limited number of users, detailing the Antelope Valley Project. The Department produces maps for end-users within the Department and the public. Maps depict economic development and redevelopment locations and activities.

Interactions

Data interactions are depicted in the following figure.



2.1.21 Weed Control Authority

Function and Activities

The Weed Control Authority is responsible for controlling noxious weeds within the County (State law) and weed abatement within the City of Lincoln (interlocal agreement). The authority performs 65 to 100 inspections per day, totaling approximately 2,600 inspections for noxious weeds in the County in 2004 on 1,300 sites and 4,000 inspections for weed abatement in the City for 2004 on 2,000 sites. The amount of noxious weeds within the County has been reduced by 50 percent to 75 percent through the Authority's efforts, reducing the total cost to control weeds.

The Authority has six seasonal inspectors and one permanent chief inspector. Digital data entry in the field has reduced cost within the Authority.

Unpaid bills for noxious weeds and weed abatement are conveyed to the County Assessor where a special assessment is placed on the property.

Importance of Geographic Information

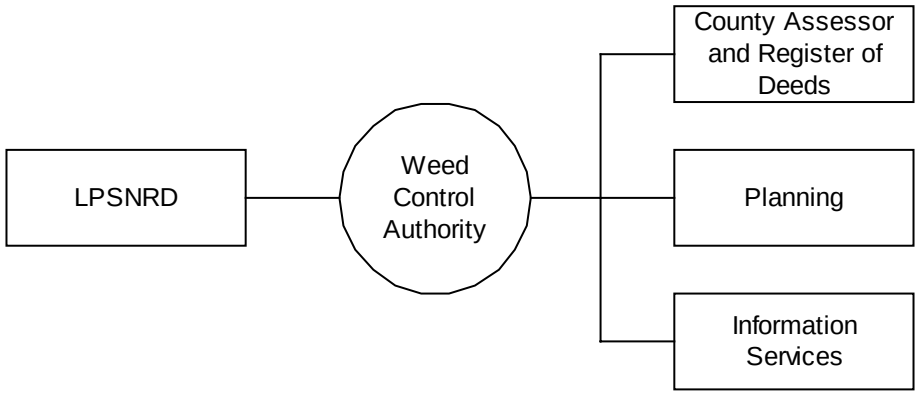
GIS has benefited the Authority allowing the Authority to do more inspections with less staff. The Authority supplies information on noxious weeds to the ArcIMS Web site hosted by the City/County once a year. A listing of current inspections can be identified from the City/County Internet's on-line services. The inspections are accessed from the Oracle 8 database, supported by Information Services.

The Authority deals with the lag time in getting updated parcel information from the County Assessor/Register of Deeds. At times, this can cause problems, when notifications to property owners are needed and in identifying when special assessment taxes have been paid. In addition, property ownership along streams is at times unclear. Base map information is accessed from the shared GIS drive. However, due to the lack of authority of the drive, needed files sometimes cannot be accessed. The Authority uses this data to create maps in ArcView 3.2.

Advanced work orders are pre-populated with information for field inspections of noxious weeds, since these inspections are based on past records. Work orders for weed abatement are generated on a complaint basis. Aerial photos are also used for inspections. Before going into the field, a printout of the location to inspect along with an aerial photo is created.

Interactions

Data interactions are depicted in the following figure.



2.2 KEY WORKFLOWS

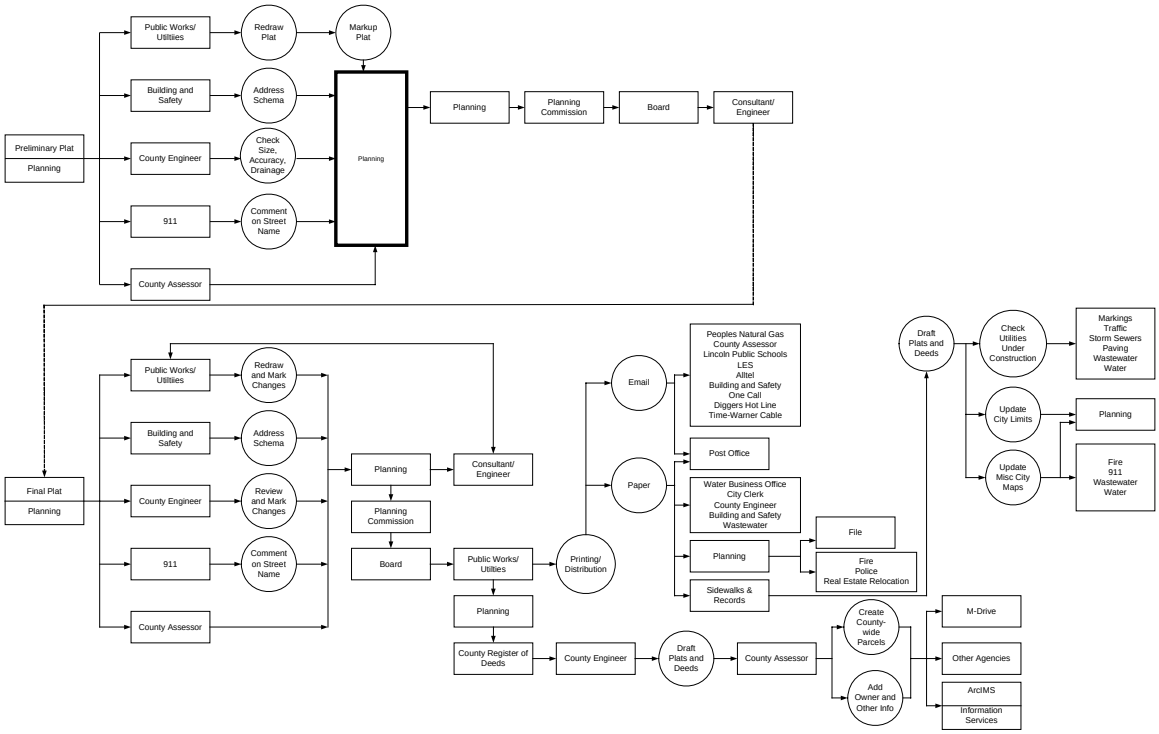
Four key workflows where potential gains could be realized in productivity and cost were identified in the survey, interviews, and working sessions—1) land base, 2) addressing, 3) plat review, and 4) centerline update. Optimizing these workflows will be an important part of the enterprise GIS implementation.

2.2.1 Land Base

The land base for Lincoln and Lancaster County is created in both Public Works and Utilities and in the County Engineer's office. This is done during various points along the platting processes. Land base features are created by Public Works during the preliminary platting process and again during the final plat submission. The County Engineer's office constructs its land base data with the final plat. As a result, there are some redundant work efforts.

The development of the land base is further complicated by the fact that the two groups creating the data follow different standards for the creation of that data. As a result, the two data sets do not always match. The following figure illustrates the creation of the land base data through the platting process.

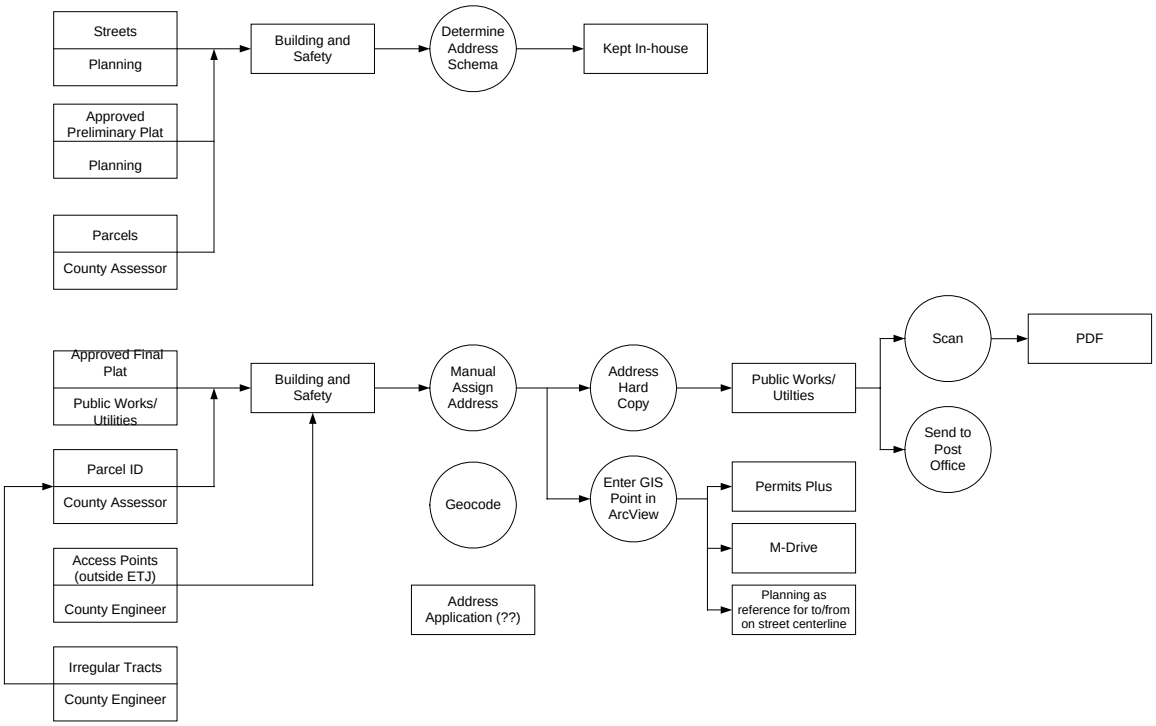
Please note: The platting process is very complex. This drawing is not made to illustrate all of its complexities – only those that relate to the creation and use of GIS data.



2.2.2 Addressing

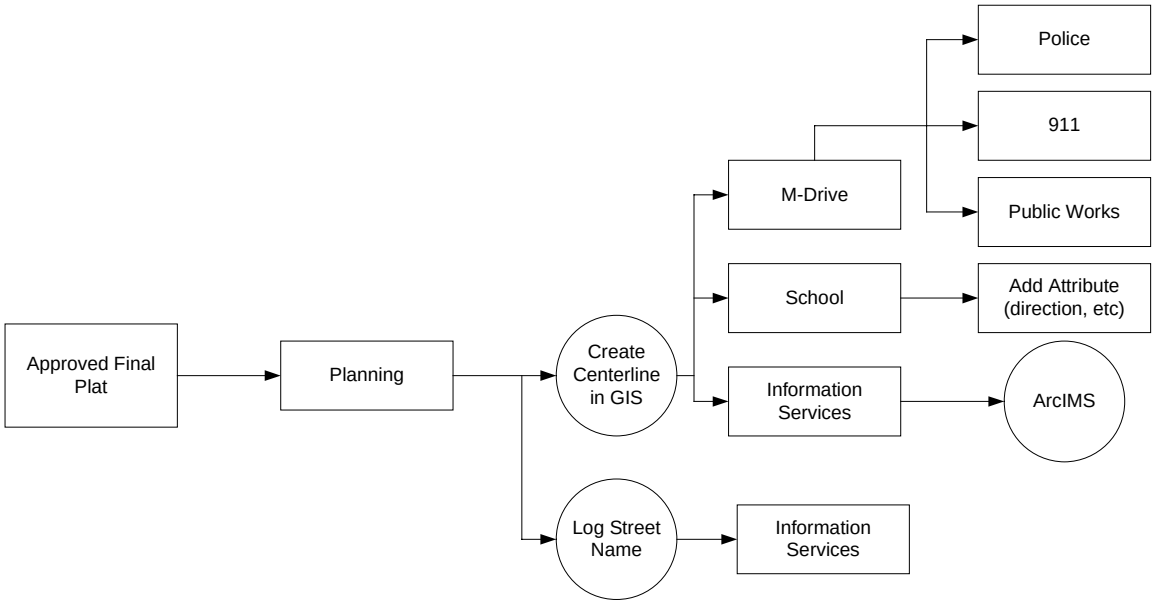
Addressing for new development is performed by the Building and Safety Department. Building and Safety obtains streets and pre-plats from the Planning Department that assist in addressing. A final plat is obtained from the Public Works/Utilities Department, which is then used along with the Parcel ID from the County Assessor to enter the location of the address into the GIS address layer. A hard copy of the final plat is sent back to Public Works/Utilities for archiving after the address has been noted on the plat.

The following flowchart depicts the interaction and exchange of information during the addressing process.



2.2.3 Centerline Update

The street centerline layer for the City/County is maintained by the Planning Department. After the Department receives a final plat, the street is input into the GIS.



SECTION 3
OVERVIEW OF CURRENT SYSTEMS INFORMATION RESOURCES

3.1 EXISTING SYSTEMS AND APPLICATIONS

The City of Lincoln/Lancaster County employs a variety of applications across many computer platforms to perform their daily functions and duties more efficiently and effectively. These software applications can be described and divided according to their general functionality, such as directly GIS-related, design and drawing support-related, or database-related. This section of the document outlines the existing computer environment in the City/County and describes software applications used by each department, as well as the data sets that support these systems. Data described in this section will be classified as geographic data which includes maps and drawings, or tabular data which accounts for all other automated data stored in database systems (i.e., Excel, Access, Lotus123) or data maintained manually in hard copy format. It will be clear from the tables and commentaries in this section that the City of Lincoln/Lancaster County is making a positive move to automating much of their data so that maintenance and accuracy can be monitored and controlled.

3.2 EXISTING COMPUTING ENVIRONMENT

Table 3-1 outlines each of the current computer systems and applications used within the City/County. Under the "Enterprise" heading, those systems that are used and available to most departments within the City/County are listed, and those systems specific to a particular department are listed under the specific departments.

Table 3-1: Departmental or Enterprise Current Applications

Enterprise and City Departments	Application or System Name *(type of system in parentheses)*
Enterprise	• ArcIMS • ArcSDE • JD Edwards (Accounting) • Microsoft Office Products (word processing; database; presentation software, including Excel, Access, Word, PowerPoint, etc.) • Oracle • WordPerfect
Building and Safety	• ArcGIS • ArcView GIS • 'PERMITS' Plus

Table 3-1: Departmental or Enterprise Current Applications (continued)

Enterprise and City Departments	Application or System Name *(type of system in parentheses)*
County Assessor/ Register of Deeds	• ArcGIS • DB2 • EagleRecorder/EagleCM • OASIS • Orion • 'PERMITS' Plus • SQL Server
County Engineer	• ArcGIS • AutoCAD • Cartegraph • Eagle Point • Rbase
Finance	• DB2 • InTears
Finance—Communications Center (911)	• ArcView GIS • PSSI (CAD)
Fire	• FireView • Opticom • PinPoint (RMS) • Prime
Health	• ArcGIS • ArcIMS • ArcPad • Crystal Reports • DB2 • SQL Server
Lincoln Electric System	• ArcGIS • ArcView • ArcPad • ArcReader • PERMITS Plus • DB2 • OSPInsight • PLS-CAD
Lower Platte South Natural Resources District	• ArcGIS • SQL Server
Parks and Recreation	• ArcView GIS • AutoCAD • MicroStation
Planning	• ArcGIS • NoBell • 'PERMITS' Plus
Police	• Criminal Justice Information System • CrimeView

Table 3-1: Departmental or Enterprise Current Applications (continued)

Enterprise and City Departments	Application or System Name *(type of system in parentheses)*
Public Works/Utilities	• ArcGIS • ArcView • Cartegraph • GEOPAK • Hansen • Info Tech • Lotus123 • MicroStation • R:BASE
Urban Development	• ArcGIS
Weed Control Authority	• ArcView GIS

3.3 CURRENT SOFTWARE OVERVIEW

Brief summaries of the major software packages used by the various departments throughout the City/County follow. These systems and the data they hold may potentially be integrated with City/County GIS data, therefore, it is important that all systems are understood in terms of the data they hold and the functions they perform.

3.3.1 Enterprise Applications

ArcIMS

ESRI's ArcIMS (Internet mapping service) software provides the foundation for disseminating high-end GIS and mapping services using Internet technology. ArcIMS software enables users to integrate local data sources with Internet data sources for display, query, and analysis in an easy-to-use Web browser.

ArcIMS permits the exchange, integration, and analysis of data. Users can combine data and information accessed using the Internet with local data for display, query, and analysis. ArcIMS has been specifically engineered to provide GIS data and tools on the Internet. The application can be used to some extent "out of the box" or can be customized using standard COM or object-oriented programming, such as Java or HTML.

Information Services maintains the City/County ArcIMS services, including converting and loading data and designing the individual Web sites. The Health Department also maintains its own internal ArcIMS Web site.

ArcSDE

ArcSDE software from ESRI is a server-side product that is used to access data stored in an RDBMS (relational database management system). This product stores all data (graphics and tabular data) in database tables and provides software to support spatial indexing and efficient mapping and data analysis.

The Information Services Division stores the data used within the ArcIMS Web site inside of Oracle 9i and ArcSDE 9.0.

J.D. Edwards

An older version of J.D. Edwards software is used for accounts payable, consolidated billing, and fixed assets within the Finance Department. The database is located on the AS400, maintained by the Information Services Division. In addition, the Parks and Recreation Department uses the software for accounting purposes, tracking repairs, and maintenance and billing for vandalism.

Microsoft Office

City and County staff use the Microsoft Office suite of products, including Word, Excel, Access, and PowerPoint, for example, to compose reports, to create and maintain databases, and to develop presentations.

Oracle

Oracle 8, 9i, and 10G are installed at the City/County. The databases and servers are maintained by Information Services. The Weed Control Authority utilizes Oracle 8 for its weed control database. The Information Services Division has built a custom interface for data entry for the Department. The Noxious Weeds Web site reads information directly from the Oracle database. The Finance Department utilizes Oracle for water billing, permits, and billing fees.

3.3.2 Departmental Applications

ArcGIS

ArcGIS is a suite of desktop GIS products from ESRI that consists of several products to create, edit, view and share geographic data. The suite of products has different licensing schemas depending on the functionality required and extensions that enhance the functionality of the base product. ArcGIS is used within several departments within the City/County, including Building and Safety, County Assessor/Register of Deeds, County Engineer, Health, LPSNRD, Planning, Public Works/Utilities, and Urban Development. Some of the departments have their own ESRI accounts and license files. Others share license and account information maintained by Information Services.

ArcView GIS

ArcView GIS is an ESRI desktop GIS product currently utilized by Building and Safety, the Communications Center (911), Parks and Recreation, Public Works/Utilities, and the Weed Control Authority. ESRI has developed ArcView for the less-intensive GIS user allowing the easy creation of maps. ArcView GIS has been superseded by the ArcGIS suite of products.

ArcPad

ArcPad from ESRI allows users to capture data in the field via a laptop or handheld device. ArcPad provides immediate data availability and validation while in the field, as well as integration with GPS. The software downloads an image or map layer via wireless technology using a TCP/IP connection. ArcPad can also be used with ArcIMS software. ArcPad utilizes GIS databases and software systems that reside on the GIS server. Changes and additions can be uploaded to the master database residing on the GIS server from the ArcPad unit. Users can also create custom input forms from the GIS database for use in the field. ArcPad is currently used by the Health Department in the Animal Control Division.

AutoCAD

This software, produced by Autodesk, is used for some of the architectural drafting needs within the City/County. AutoCAD is used in the Parks and Recreation Department and the County Engineer's Office.

Cartegraph

Cartegraph is an asset inventory and management software product. This software has several modules associated with it that work with a particular type of asset, such as SIGNview for sign inventory. The County Engineer uses Cartegraph for managing signs, culverts, and bridges.

CrimeView

CrimeView software from The Omega Group is used by the Police Department to allow access to the public and internally to crime data. The Department has the suite of CrimeView products—CrimeView, CrimeView Web, and CrimeView Community. The products utilize ArcIMS and ArcGIS software.

Criminal Justice Information System

The Police Department utilizes a Criminal Justice Information System that is proprietary.

Crystal Reports

The Health Department utilizes Crystal Reports, a reporting application, for reporting purposes.

DB2

Several departments store information in DB2, a database management system from IBM. The departments that use DB2 are the County Assessor/Register of Deeds, Finance, and Health.

Eagle Point

Eagle Point is used in conjunction with AutoCAD by the County Engineer to assist with road design.

EagleRecorder/EagleCM

The County Assessor/Register of Deeds will implement EagleRecorder, a recording and imaging system from Tyler Technologies, in June of 2005. The office will also implement EagleCM, a document and content management system that links EagleRecorder with the Orion system.

FireView

FireView is a GIS interface that can be integrated with ArcView software. FireView is used in the mapping, analysis, and reporting of data by the Fire Department.

GEOPAK

GEOPAK software from Bentley is a range of software for bridge, engineering, structure, site and survey modeling, design, and mapping. It is currently used within the Public Works/Utilities Department for design activities and drainage studies.

Hansen

The Lincoln Water System Division of the Public Works/Utilities Department uses Hansen Information Technologies software for asset management. The Water Division also uses Hansen Fieldworks in the field.

Info Tech

Appia and FieldManager software by Info Tech are used within the Public Works/Utilities Department for managing and tracking inspections, field notes, construction information, and construction estimates.

InTears

InTears is a mainframe system developed by Information Services. The Finance department uses it for payroll.

Lotus Notes

Lotus Notes is used in the Public Works/Utilities department. Lotus Notes is a spreadsheet application that also provides email functions.

MicroStation

The Parks and Recreation and Public Works/Utilities Departments use Bentley Systems' MicroStation software for design and construction of infrastructure. Parks and Recreation obtains a license for the software from Public Works/Utilities.

NoBell

NoBell software is used by the Planning Department for bond tracking and impact fee calculation. It is a mainframe application housed on the AS400.

OASIS

The County Assessor/Register of Deeds previously utilized OASIS, an appraisal and tax administration software from Tyler Technology's Cole Layer Trumble Company (CLT) division. However, the office is in the process of moving to Orion software.

Opticom

The Opticom Priority Control System by 3M is used by the Fire Department to control traffic signals during emergencies, known as traffic preemption.

Orion

Tyler Technology's Orion software is currently being implemented in the County Assessor/Register of Deeds Office. The software will allow the viewing of deeds through a browser. The software will be used as the CAMA (computer-assisted mass appraisal) system for the County, including assessment, personal property, appeals, tax billing and collection, and delinquent taxes. The database uses an SQL Server database.

'PERMITS' Plus

Accela's 'PERMITS' Plus software is a permitting and activity tracking software. Building and Safety, the County Assessor/Register of Deeds, and Planning use the software. The software utilizes an Oracle database maintained by Information Services.

PinPoint

PinPoint software is used by the Fire Department for EMS record management.

Prime

The Fire Department's records management system was written by Information Services and is stored on the mainframe.

PSSI

Public Safety Systems Incorporated (PSSI) CAD (Computer Aided Dispatch) software is used for emergency dispatch by the Communications Center (911) to dispatch for all emergency services, including fire, police, and EMS. The software has been in place within the Division since 1994. The Division has an enterprise license that allows unlimited licenses and seats for the CAD software. The CAD software interfaces with the ArcView GIS software also used within the Division.

R:BASE

R:BASE is a relational database management system used by Public Works/Utilities for sanitary sewer records.

SQL Server

SQL Server from Microsoft is a relational database management system used by Lower Platte South Natural Resources District, the Health Department, and the County Assessor/Register of Deeds.

WordPerfect

Several City and County departments use WordPerfect for word processing.

3.4 EXISTING GEOGRAPHIC INFORMATION

A number of maps, drawings, and tabular data sets that contain at least some element of geographic data are used throughout various departments. Summaries of these data sets are included in Tables 3-2 and 3-3.

3.4.1 Maps and Drawings

Table 3-2 lists and describes all of the maps and drawings currently being utilized by the City of Lincoln/Lancaster County, either automated or manual. Table 3-2 provides details about each map and drawing. All of these maps and drawings can potentially be integrated and used within an Enterprise GIS for the City/County.

Most of the digital map data is stored in MicroStation or ESRI shapefile and coverage formats. This data, and its current use, is a good indication of the type of functionality the City/County desires from an Enterprise GIS. Many of these maps were created based

upon specific departmental information and requirements. Some of these maps do not require updates; however, others do. At this time, some departments do their own custom map-making and data editing related to their business processes. Other departments query mapping products from another department. With the introduction of an Enterprise GIS, all staff members will be able to generate maps at their desktops, without having to rely on one individual or department to meet their mapping needs.

Some of the key maps and drawings to be used in the City of Lincoln/Lancaster County Enterprise GIS follow. Throughout the interview process, each of these maps was repeatedly reported to be of importance and used daily by multiple departments:

Maps

- Address Points
- Aerials
- Cadastral (parcel, subdivision)
- City Limits
- Council Districts
- Survey Control Points
- Streets
- Streams
- Utility (sanitary sewer, water)
- Zoning
- Floodplain.

The contents of these maps are critical business elements that are routinely used by most, if not all, City and County departments as they make work decisions. Development of an enterprise GIS database should place these components as a top priority.

Table 3-2: Existing Maps and Drawings

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Building and Safety	Addresses		A		Windows XP		9,000	Daily	Building and Safety
Building and Safety	Aerials								
Building and Safety	Airport Noise/Height								
Building and Safety	County Fees	Land Base	A/HC	Paper				Sporadically	Building and Safety
Building and Safety	Easement								
Building and Safety	Group Home	Parcels	A/HC	Paper				Sporadically - When Homes are Added	Building and Safety
Building and Safety	Historic Preservation								
Building and Safety	Inspector Areas: Building, Housing, Plumbing, Mechanical, Electrical		A		Windows XP		5 each section	Sporadically	Building and Safety
Building and Safety	Parcel								
Building and Safety	Special Permits	Parcels	A					Weekly	Building and Safety and Information Services
Building and Safety	Street								
Building and Safety	Zoning								
Communications Center (911)	Aerial photos								
Communications Center (911)	Airports in Lancaster County								
Communications Center (911)	Arterials								
Communications Center (911)	Centerline								
Communications Center (911)	City Limits								
Communications Center (911)	Commonplace								911
Communications Center (911)	Hydrants								Fire
Communications Center (911)	LFR (Lincoln Fire and Rescue) Stations								911
Communications Center (911)	LFR Fire Reporting Districts and Zones								911

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Communications Center (911)	LPD (Lincoln Police Department) Substations								911
Communications Center (911)	LPD Beats								
Communications Center (911)	LPD Reporting Districts								LPD/911
Communications Center (911)	LPD Teams								
Communications Center (911)	LSO (Lancaster County Sheriff's Office) Reporting Districts								
Communications Center (911)	LSO Teams								911
Communications Center (911)	Major Roads through Lancaster County								911
Communications Center (911)	Parcels								
Communications Center (911)	Parks and Lakes								
Communications Center (911)	Pipelines								
Communications Center (911)	Railroads								
Communications Center (911)	Roads, County Lines, and Fire Districts outside Lancaster County								
Communications Center (911)	Rural Volunteer Fire Districts								911
Communications Center (911)	Schools								LPD
Communications Center (911)	Sewer Locations								
Communications Center (911)	Towers								911
Communications Center (911)	Trails								911

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Communications Center (911)	Villages								
Communications Center (911)	Water Mains								
County Assessor/ Register of Deeds	864 Sectional Plat Maps		HC	Paper			230	Semi-annually	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Address Point File								
County Assessor/ Register of Deeds	Adjacent Counties								
County Assessor/ Register of Deeds	Aerials - 1997-99 BW Section Tiles								
County Assessor/ Register of Deeds	Aerials - 2002 Color Section Tiles								
County Assessor/ Register of Deeds	Aerials - Mosaic of 2002 color aerials								
County Assessor/ Register of Deeds	Agricultural Land Use by Precinct (County Assessor)	Parcels	A		Windows XP	200	25 precincts	Sporadically	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Billboard Locations								
County Assessor/ Register of Deeds	Billboard Locations w/Added Locations through Oct. 2003								
County Assessor/ Register of Deeds	Cadastral (subdivisions, parcels, etc.)	Parcels	A		Windows XP	200	102,700 parcels	Daily	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Cadastral Maps by Section (Hard Copy, 30 x 30)		HC	Paper			230		County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Duplexes (County Assessor)								
County Assessor/ Register of Deeds	Fire District Lookup Table by Taxing District	Parcels	A		Windows XP	200	129	Sporadically	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Ownership Parcels as Countywide PGDB	Parcels	A		Windows XP	200	102,700	Sporadically	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Ownership Parcels as Single Shapefile	Parcels	A		Windows XP	200	102,700	Monthly	County Assessor/ Register of Deeds

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
County Assessor/ Register of Deeds	Ownership Parcels by Section	County Sections	A		Windows XP	200	864 sections	Daily	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Parcel	Parcels	A		Windows XP	200	102,700	Daily	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Parcels (IMS application)								
County Assessor/ Register of Deeds	Residential Neighborhoods (County Assessor)		A		Windows XP		230	Annually	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Rural Neighborhoods (County Assessor)		A		Windows XP		8	Sporadically	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	School District Lookup Table by Taxing District	Parcels	A		Windows XP	200	21 School Districts	Sporadically	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	School Districts		A		Windows XP		21	Sporadically	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Sectional Maps (Hard Copy, 8.5 x 11)		HC	Paper			864	Annually	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Subdivision plats (hard copies w/various scales, sources, and conditions)		HC						
County Assessor/ Register of Deeds	Tax Increment Financing (TIF) Districts								
County Engineer	1989 median income by census tract from 1990 census	Land Base	A		Unix and Windows XP		864	Continuously	County Engineer
County Engineer	Aerial photo hardcopy (several hundred paper hard copies)		HC	Paper			Numerous	Sporadically	County Engineer
County Engineer	Aerials - Mosaic of 2002 color aerials								
County Engineer	City and County Zoning Districts								
County Engineer	City Limit								
County Engineer	City Limits Geo								
County Engineer	County Elevation Relief		A		Unix and Windows XP		1	As Needed	County Engineer

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
County Engineer	County Engineer Maintenance Districts		A		Unix and Windows XP		1	As Needed	County Engineer
County Engineer	County Engineer Paving Districts		A		Unix and Windows XP		1	As Needed	County Engineer
County Engineer	County-wide Topographic File (DRG Format)	County Sections	A		Unix and Windows XP		24	Sporadically	County Engineer
County Engineer	False Color Infra-red Landsat TM Image								
County Engineer	Future County Road Improvements	County Roads	A		Unix and Windows XP		1	Annually	County Engineer
County Engineer	Future County Trails								
County Engineer	GPS and Survey Control Points w/State Plane and County Grid coordinates	Control Points	A		Unix and Windows XP		1	As Needed	County Engineer
County Engineer	Land Base (Legal Lots) - 864 Sections for Lancaster County	Land Base	A		Unix and Windows XP		864	Continuously	County Engineer
County Engineer	Land Base (Legal Lots) - 864 Sections for Lancaster County	Land Base	HC	Paper		1 inch = 200 feet	864	As Needed	County Engineer
County Engineer	Land Base/Legal Lots (PW&U: dgn)								
County Engineer	Lincoln City and County Village Limits (County Engineer)		A		Unix and Windows XP		1	As Needed	County Engineer
County Engineer	Lincoln City Limits (Current)		A		Unix and Windows XP		1	As Needed	County Engineer
County Engineer	Park Land								
County Engineer	Proposed Five-year Road & Bridges Plan (separate coverage for each year)	County Roads	A		Unix and Windows XP		4	Annually	County Engineer
County Engineer	Proposed next fiscal year road and bridge projects	County Roads	A		Unix and Windows XP		1	Annually	County Engineer
County Engineer	Quarter Sections								
County Engineer	Rail Lines								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
County Engineer	Raster lattice created from digitized 10 feet contours (USGS topo series)								
County Engineer	Residential Subdivisions								
County Engineer	Sectional Maps (Hard Copy, 8.5 x 11)								
County Engineer	Streams								
County Engineer	Streets								
County Engineer	Streets Geo								
County Engineer	Subdivision Boundaries	Land Base	HC	Paper		As Required	Numerous	Continuously	County Engineer
County Engineer	Subdivision plats (hard copies w/various scales, sources, and conditions)								County Assessor/ Register of Deeds
County Engineer	Ten foot contours topo interval appended as a single, unified file		A		Unix and Windows XP		1	Sporadically	County Engineer
County Engineer	Ten foot contours topo intervals – at the Township level (24 coverages)		A		Unix and Windows XP		24	Sporadically	County Engineer
County Engineer	Towns		A		Unix and Windows XP		11	As Needed	County Engineer
County Engineer	Township level GPS and survey control points in 'point coverage' format	Control Points	A		Unix and Windows XP		24	As Needed	County Engineer
County Engineer	True Color Landsat TM Image								
County Engineer	Village Zoning								
Fire and Rescue	Building Floorplans/Site Plans								
Fire and Rescue	Hazmat Maps		HC						
Fire and Rescue	Hydrant		HC						
Health	Aerials - Mosaic of 2002 Color Aerials								
Health	Animal Control Maps								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Health	Base Map								
Health	Blood Lead Levels								
Health	Census Block Group Boundaries								
Health	Census Block Groups (LPD)								
Health	Census Tract Boundaries								
Health	City and County Zoning Annotation								
Health	City and County Zoning Districts								
Health	City Council Districts								
Health	County Elevation Relief								
Health	Fire Stations								
Health	Gas Pipelines								
Health	Hazardous Area Buffering								
Health	Homeowner Associations								
Health	Land Use Planning Reviews								
Health	Lincoln City Limits (Current)								
Health	LPS District Boundary								
Health	LPS Elementary Attendance Areas								
Health	LPS Elementary Site Locations								
Health	LPS High School Attendance Areas								
Health	LPS High School Site Locations								
Health	LPS Middle School Attendance Areas								
Health	LPS Middle School Site Locations								
Health	Parks (PW&U: dgn)								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Health	Population Distribution Maps								
Health	Rail Lines								
Health	Residential Fires								
Health	School Districts								
Health	Streets								
Health	Summer Food Program (meals served)								
Health	Vital Statistics Maps								
Health	West Nile Virus Bird Testing								
Information Services	Aerial Mosaic								
Information Services	City Council Districts								
Information Services	City of Lincoln Three Mile Zoning Jurisdiction								
Information Services	County Board Districts								
Information Services	Floodplain Coverage								
Information Services	Lincoln City Limits (Current)								
Information Services	Lincoln Municipal Airport Environs								
Information Services	Lincoln Municipal Airport Flight Approach Zones								
Information Services	Lincoln Municipal Airport Noise Contours								
Information Services	LPD "Beats"								
Information Services	LPD Headquarters and Substations								
Information Services	LPD Reporting Districts								

Table 3-2: Existing Maps and Drawings (continued)

Department Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Information Services	LPD Team Areas								
Information Services	LPS Elementary Site Locations								
Information Services	LPS High School Site Locations								
Information Services	LPS Middle School Site Locations								
Information Services	Parcel								
Information Services	Rail Lines								
Information Services	Streets								
Information Services	Streets Coverage								
Information Services	Zoning (LPD)								
Lincoln Electric System (LES)	Address Point File	Parcels	A		Windows 2000			Monthly	County Assessor/ Register of Deeds
Lincoln Electric System (LES)	Aerials - 2002 Color Section Tiles	Parcels	A		Windows 2000			Annually	
Lincoln Electric System (LES)	Aerials - Mosaic of 2002 Color Aerials		A		Windows 2000			Annually	
Lincoln Electric System (LES)	Cell Phone Towers	Parcels	A		Windows 2000			Annually	
Lincoln Electric System (LES)	City and County Zoning Annotation		A		Windows 2000			Annually	
Lincoln Electric System (LES)	City and County Zoning Districts		A		Windows 2000			Annually	
Lincoln Electric System (LES)	Corporate Limits of Cities and Villages (IMS Application)	Parcels	A		Windows 2000			Annually	
Lincoln Electric System (LES)	Floodplain	Parcels	A		Windows 2000			Annually	

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Lincoln Electric System (LES)	Floodplain Coverage								
Lincoln Electric System (LES)	GPS and Survey Control Points w/State Plane and County Grid Coordinates								
Lincoln Electric System (LES)	Historic Districts								
Lincoln Electric System (LES)	Historic Sites								
Lincoln Electric System (LES)	Land Base (Legal Lots) - “Appended” cover as a unified file								
Lincoln Electric System (LES)	Land Base (Legal Lots) - 864 Sections for Lancaster County								
Lincoln Electric System (LES)	Land Base/Legal Lots (PW&U: dgn)		A		Windows 2000			Annually	
Lincoln Electric System (LES)	LES Easements								
Lincoln Electric System (LES)	LES Electric Distribution Network								
Lincoln Electric System (LES)	LES Electric Distribution Non-Network								
Lincoln Electric System (LES)	LES Electric Transmission Network								
Lincoln Electric System (LES)	LES Electric Transmission Non-Network								
Lincoln Electric System (LES)	LES Map Grid/Service Area Boundary								
Lincoln Electric System (LES)	LIDAR (3-meter)		A		Windows 2000			Semi-annually	
Lincoln Electric System (LES)	LIDAR Data (1-meter)		A		Windows 2000			Annually	
Lincoln Electric System (LES)	Lincoln Annexations								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Lincoln Electric System (LES)	Lincoln City Limits (Current)		A		Windows 2000			Annually	
Lincoln Electric System (LES)	Lincoln Municipal Airport Environs		A		Windows 2000			Annually	
Lincoln Electric System (LES)	Lincoln Municipal Airport Environs Exceeding 1,248 ft. Elevation		A		Windows 2000			Annually	
Lincoln Electric System (LES)	Lincoln Municipal Airport Flight Approach Zones		A		Windows 2000			Annually	
Lincoln Electric System (LES)	Lincoln Municipal Airport Noise Contours		A		Windows 2000			Annually	
Lincoln Electric System (LES)	Lincoln Municipal Airport Runways		A		Windows 2000			Annually	
Lincoln Electric System (LES)	Major Streets (IMS Application)								
Lincoln Electric System (LES)	Parcel	Parcels	A		Windows 2000			Monthly	
Lincoln Electric System (LES)	Situs Addresses (PW&U: dgn)								
Lincoln Electric System (LES)	South and East Beltway Alignment	Parcels	A		Windows 2000			Annually	
Lincoln Electric System (LES)	South Beltway (PW&U: dgn)		A		Windows (Other)			Annually	
Lincoln Electric System (LES)	Streets		A		Windows 2000			Monthly	
Lincoln Electric System (LES)	Streets (PW&U: shp)	Parcels	A		Windows 2000			Monthly	
Lincoln Electric System (LES)	Subdivision Boundaries								
Lincoln Electric System (LES)	Ten Foot and Two Foot Contour Lines (PW&U: shp)	Parcels	A		Windows 2000			Semi-annually	
Lincoln Electric System (LES)	Ten foot contours topo interval appended as a single, unified file								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Lincoln Electric System (LES)	Ten foot contours topo intervals – at the Township level (24 coverages)								
Lincoln Electric System (LES)	Topographic Contour Lines (PW&U: dgn)								
Lower Platte South Natural Resources District (LPSNRD)	Aerial photo hardcopy (several hundred paper hard copies)								
Lower Platte South Natural Resources District (LPSNRD)	Aerials - Mosaic of 2002 color aerials								
Lower Platte South Natural Resources District (LPSNRD)	Cadastral (subdivisions, parcels, etc.)								
Lower Platte South Natural Resources District (LPSNRD)	City and County Zoning Annotation								
Lower Platte South Natural Resources District (LPSNRD)	City and County Zoning Districts								
Lower Platte South Natural Resources District (LPSNRD)	City Council Districts								
Lower Platte South Natural Resources District (LPSNRD)	Floodplain								
Lower Platte South Natural Resources District (LPSNRD)	Floodplain coverage								
Lower Platte South Natural Resources District (LPSNRD)	Floodplain Easements (PW&U: shp)								
Lower Platte South Natural Resources District (LPSNRD)	Future County Trails								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Lower Platte South Natural Resources District (LPSNRD)	GPS and Survey Control Points w/State Plane and County Grid coordinates								
Lower Platte South Natural Resources District (LPSNRD)	Land Use Base								
Lower Platte South Natural Resources District (LPSNRD)	LES Easements								
Lower Platte South Natural Resources District (LPSNRD)	LIDAR (3-meter)								
Lower Platte South Natural Resources District (LPSNRD)	LIDAR Data (1-meter)								
Lower Platte South Natural Resources District (LPSNRD)	LPSNRD Dam Locations								
Lower Platte South Natural Resources District (LPSNRD)	LPSNRD Lakes and COE Lakes								
Lower Platte South Natural Resources District (LPSNRD)	LPSNRD Trails								
Lower Platte South Natural Resources District (LPSNRD)	Monitor Wells								
Lower Platte South Natural Resources District (LPSNRD)	NE Natural Resource District (NRD) Boundaries (w/County Boundaries)								
Lower Platte South Natural Resources District (LPSNRD)	Ownership Parcels as Single Shapefile								
Lower Platte South Natural Resources District (LPSNRD)	Ownership Parcels by Section								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Lower Platte South Natural Resources District (LPSNRD)	Parcel								
Lower Platte South Natural Resources District (LPSNRD)	Parks Shapefile								
Lower Platte South Natural Resources District (LPSNRD)	Potential Flood Zone								
Lower Platte South Natural Resources District (LPSNRD)	Raster lattice created from digitized 10 feet contours (USGS topo series)								
Lower Platte South Natural Resources District (LPSNRD)	Rural Water Districts								
Lower Platte South Natural Resources District (LPSNRD)	Salt Creek Tiger Beetle Protection Areas (shp)								
Lower Platte South Natural Resources District (LPSNRD)	Storm Drainage								
Lower Platte South Natural Resources District (LPSNRD)	Streams (PW&U: shp)								
Lower Platte South Natural Resources District (LPSNRD)	Streets								
Lower Platte South Natural Resources District (LPSNRD)	Streets (PW&U: shp)								
Lower Platte South Natural Resources District (LPSNRD)	Streets Coverage								
Lower Platte South Natural Resources District (LPSNRD)	Subdivision Boundaries								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Lower Platte South Natural Resources District (LPSNRD)	Threatened, Endangered, and Heritage Species								
Lower Platte South Natural Resources District (LPSNRD)	Trails (Arcs and Points)								
Lower Platte South Natural Resources District (LPSNRD)	Tree Masses								
Lower Platte South Natural Resources District (LPSNRD)	Urban Trails								
Lower Platte South Natural Resources District (LPSNRD)	Wilderness Park: Boundary								
Lower Platte South Natural Resources District (LPSNRD)	Wilderness Park: Salt Creek and Tributaries								
Lower Platte South Natural Resources District (LPSNRD)	Wilderness Park: Trails								
Lower Platte South Natural Resources District (LPSNRD)	Zoning								
Parks and Recreation	Aerials		A						
Parks and Recreation	Park Facility								
Parks and Recreation	Parks		A						Planning
Parks and Recreation	Trails								
Planning	Adjacent Counties		A		Windows XP			Static	Planning
Planning	Airport and Private Airfields		A		Windows XP			Sporadically	Planning
Planning	Archived Land Uses In County		A		Windows XP			Annually	Planning

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Planning	Bikeway/Pedestrian Walkways								
Planning	Building Footprints								
Planning	Capitol Parkway West View Management Corridor		A		Windows XP			Static	Planning
Planning	Census Block Group Boundaries		A		Windows XP			Decennial	Planning
Planning	Census Tract Boundaries		A		Windows XP			Decennial	Planning
Planning	City and County Zoning Annotation		A		Windows XP			Sporadically	Planning
Planning	City and County Zoning Districts		A		Windows XP			Sporadically	Planning
Planning	City Board of Zoning Appeals (BZA)		A		Windows XP			Sporadically	Planning
Planning	City Council Districts		A		Windows XP			Decennial	Planning
Planning	City of Lincoln Three Mile Zoning Jurisdiction		A		Windows XP			Sporadically	Planning
Planning	Community Recreation Facilities		A		Windows XP			Sporadically	Planning
Planning	Community Unit Plans (CUPs)		A		Windows XP			Sporadically	Planning
Planning	Conservation Reserve Program (CRP) Fields		A		Windows XP			Annually	Planning
Planning	Corrosion of Concrete Potential		A		Windows XP			Static	Planning
Planning	County Board Districts		A		Windows XP			Decennial	Planning
Planning	County Elevation Relief		A		Windows XP			Static	Planning
Planning	County School Facilities		A		Windows XP			Sporadically	Planning
Planning	Dam Sites		A		Windows XP			Sporadically	Planning
Planning	Drainage Basins		A		Windows XP			Static	Planning
Planning	Existing Land Uses in County		A		Windows XP			Weekly	Planning
Planning	Existing Street Right-of-Way		A		Windows XP			Sporadically	Planning

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Planning	Farm Service Agency (FSA) Field Boundaries		A		Windows XP			Annually	Planning
Planning	Fire Stations		A		Windows XP			Sporadically	Planning
Planning	Flow Rates for Registered Wells (1)		A		Windows XP			Sporadically	Planning
Planning	Flow Rates for Registered Wells (2)		A		Windows XP			Sporadically	Planning
Planning	Frost Action Potential of Soils		A		Windows XP			Static	Planning
Planning	Future City Street Improvements		A		Windows XP			Sporadically	Planning
Planning	Future County Road Improvements		A		Windows XP			Sporadically	Planning
Planning	Future County Trails		A		Windows XP			Sporadically	Planning
Planning	Future Land Use Plan: City and County		A		Windows XP			Sporadically	Planning
Planning	Future Land Use Plans: Incorporated Towns and Villages		A		Windows XP			Sporadically	Planning
Planning	Future Parks		A		Windows XP			Sporadically	Planning
Planning	Future Street Right-of-Way		A		Windows XP			Sporadically	Planning
Planning	Future Tier 1 and 2 Street Right-of-Way		A		Windows XP			Sporadically	Planning
Planning	Future Urban Service Limit		A		Windows XP			Sporadically	Planning
Planning	GAP Land Cover		A		Windows XP			Static	Planning
Planning	Gas Pipelines		A		Windows XP			Sporadically	Planning
Planning	Golf Courses		A		Windows XP			Sporadically	Planning
Planning	Grain Elevators		A		Windows XP			Sporadically	Planning
Planning	Grasslands		A		Windows XP			Sporadically	Planning
Planning	Gravity Contours		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Alkalinity (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Boron (1978)		A		Windows XP			Static	Planning

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Planning	Groundwater Condition Re: Chloride (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Dissolved Solids (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Fluoride (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Hardness (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Iron (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Manganese (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Phosphorous (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Potassium (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Selenium (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Silica (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Condition Re: Sulfate (1978)		A		Windows XP			Static	Planning
Planning	Groundwater Pollution Potential		A		Windows XP			Static	Planning
Planning	Group Homes		A		Windows XP			Sporadically	Planning
Planning	Historic Districts		A		Windows XP			Sporadically	Planning
Planning	Historic Sites		A		Windows XP			Sporadically	Planning
Planning	Homeowner Associations		A		Windows XP			Sporadically	Planning
Planning	Hydrologic Soil Groups		A		Windows XP			Static	Planning
Planning	Incorporate Jurisdictions		A		Windows XP			Sporadically	Planning
Planning	Inherent Soil Quality		A		Windows XP			Static	Planning
Planning	Lancaster County Arboreta		A		Windows XP			Sporadically	Planning
Planning	Land Evaluation and Site Assessment (LESA) (1)		A		Windows XP			Static	Planning

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Planning	Land Evaluation and Site Assessment (LESA) (2)		A		Windows XP			Static	Planning
Planning	Lincoln City Limits (Current)		A		Windows XP			Sporadically	Planning
Planning	Lincoln City Limits: 1950		A		Windows XP			Static	Planning
Planning	Lincoln City Limits: 1960		A		Windows XP			Static	Planning
Planning	Lincoln City Limits: 1970		A		Windows XP			Static	Planning
Planning	Lincoln City Limits: 1980		A		Windows XP			Static	Planning
Planning	Lincoln City Limits: 1990		A		Windows XP			Static	Planning
Planning	Lincoln City Limits: 2000		A		Windows XP			Static	Planning
Planning	Lincoln Municipal Airport Environs		A		Windows XP			Sporadically	Planning
Planning	Lincoln Municipal Airport Environs Exceeding 1,248 ft. Elevation		A		Windows XP			Sporadically	Planning
Planning	Lincoln Municipal Airport Flight Approach Zones		A		Windows XP			Sporadically	Planning
Planning	Lincoln Municipal Airport Noise Contours		A		Windows XP			Sporadically	Planning
Planning	Lincoln Municipal Airport Runways		A		Windows XP			Sporadically	Planning
Planning	Lincoln Urban Area		A		Windows XP			Sporadically	Planning
Planning	Livestock Operations		A		Windows XP			Sporadically	Planning
Planning	Magnetic Flux Conditions		A		Windows XP			Static	Planning
Planning	Major Streets within General Urban Area		A		Windows XP			Sporadically	Planning
Planning	Medical Facilities		A		Windows XP			Sporadically	Planning
Planning	Mineral and Oil Extraction Locations		A		Windows XP			Sporadically	Planning
Planning	National Wetlands Inventory		A		Windows XP			Sporadically	Planning
Planning	Nebraska Capitol Environs District		A		Windows XP			Static	Planning
Planning	Nebraska Capitol View Corridors		A		Windows XP			Static	Planning
Planning	Open Space		A		Windows XP			Sporadically	Planning

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Planning	Park Land		A		Windows XP			Sporadically	Planning
Planning	Pits and Quarries		A		Windows XP			Sporadically	Planning
Planning	Potential Flood Zone		A		Windows XP			Sporadically	Planning
Planning	Potential for Landslides		A		Windows XP			Static	Planning
Planning	Potential Irrigated Corn Yield		A		Windows XP			Static	Planning
Planning	Potential Non-irrigated Corn Yield		A		Windows XP			Static	Planning
Planning	Potential Non-irrigated Sorghum Yield		A		Windows XP			Static	Planning
Planning	Potential Non-irrigated Soybean Yield		A		Windows XP			Static	Planning
Planning	Public Libraries		A		Windows XP			Sporadically	Planning
Planning	Rail Lines		A		Windows XP			Sporadically	Planning
Planning	Residential Subdivisions		A		Windows XP			Sporadically	Planning
Planning	Resource Protection Areas in Wilderness Park		A		Windows XP			Static	Planning
Planning	Root Zone Availability: Water Hold Capacity		A		Windows XP			Static	Planning
Planning	Rural Fire Districts		A		Windows XP			Sporadically	Planning
Planning	Rural Water Districts		A		Windows XP			Sporadically	Planning
Planning	Saline Wetlands		A		Windows XP			Static	Planning
Planning	Salt Valley Heritage Greenway		A		Windows XP			Sporadically	Planning
Planning	School Districts		A		Windows XP			Sporadically	Planning
Planning	Septic Tank Absorption Fields		A		Windows XP			Static	Planning
Planning	Shrink-swell Potential of Soils		A		Windows XP			Static	Planning
Planning	Soil Suitability for Sewage Lagoons		A		Windows XP			Static	Planning
Planning	South and East Beltway Alignment		A		Windows XP			Static	Planning
Planning	South and East Beltway Alternative Alignments		A		Windows XP			Static	Planning

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Planning	South and East Beltway Study Area		A		Windows XP			Static	Planning
Planning	South Beltway Corridor Protection Area		A		Windows XP			Static	Planning
Planning	Startran Fixed Route System		A		Windows XP			Sporadically	Planning
Planning	State Legislature Districts		A		Windows XP			Decennial	Planning
Planning	Streets		A		Windows XP			Sporadically	Planning
Planning	Threatened, Endangered, and Heritage Species		A		Windows XP			Sporadically	Planning
Planning	Traffic Zones		A		Windows XP			Sporadically	Planning
Planning	Tree Masses		A		Windows XP			Static	Planning
Planning	Two-plus-center-turn Lane Plan		A		Windows XP			Sporadically	Planning
Planning	Urban Growth Tier 1		A		Windows XP			Sporadically	Planning
Planning	Urban Growth Tier 1 Priority Areas		A		Windows XP			Sporadically	Planning
Planning	Urban Growth Tier 2		A		Windows XP			Sporadically	Planning
Planning	Urban Growth Tier 2 Priority Areas		A		Windows XP			Sporadically	Planning
Planning	Urban Growth Tier 3		A		Windows XP			Sporadically	Planning
Planning	Urban Planning Zones		A		Windows XP			Static	Planning
Planning	Urban Trails		A		Windows XP			Sporadically	Planning
Planning	Village Zoning		A		Windows XP			Sporadically	Planning
Planning	Voting Precincts		A		Windows XP			Sporadically	Planning
Planning	Water Table Level (1980)		A		Windows XP			Static	Planning
Planning	Wilderness Park: Salt Creek and Tributaries		A		Windows XP			Static	Planning
Planning	Wilderness Park: Trails		A		Windows XP			Sporadically	Planning
Planning	Wilderness Park: Boundary		A		Windows XP			Sporadically	Planning
Planning	Wilderness Park: Plant Habitats		A		Windows XP			Static	Planning
Planning	Zip Codes		A		Windows XP			Static	Planning
Planning	Zoning Changes In Calendar Year 1998		A		Windows XP			Static	Planning

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Planning	Zoning Changes in Calendar Year 1999		A		Windows XP			Static	Planning
Planning	Zoning Changes in Calendar Year 2000		A		Windows XP			Static	Planning
Planning	Zoning Changes in Calendar Year 2001		A		Windows XP			Static	Planning
Planning	Zoning Changes in Calendar Year 2002		A		Windows XP			Static	Planning
Planning	Zoning Changes in Calendar Year 2003		A		Windows XP			Static	Planning
Planning	Zoning Changes in Calendar Year 2004		A		Windows XP			Static	Planning
Police	Aerials - Mosaic of 2002 color aerials								
Police	Census Block Groups (LPD)								
Police	Fire Stations								
Police	Lincoln City Limits (Current)								
Police	LPD “Beats”								
Police	LPD Headquarters and Substations								
Police	LPD Reporting Districts								
Police	LPD Team Areas								
Police	LPS Elementary Attendance Areas								
Police	LPS Elementary Site Locations								
Police	LPS High School Attendance Areas								
Police	LPS High School Site Locations								
Police	LPS Middle School Attendance Areas								
Police	LPS Middle School Site Locations								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Police	Ownership Parcels as Single Shapefile								
Police	Parks, Schools, Parcels, and City Limits (polygons - refined by LPD for geocoding purposes)								
Police	Rail Lines								
Police	Railroads (LPD)								
Police	School Attendance Districts (LPD)								
Police	Streams (PW&U: shp)								
Police	Streets								
Police	Streets (PW&U: shp)								
Police	Trails (LPD)								
Police	Zoning (LPD)								
Property Management	Utility Data		HC						
Public Works & Utilities	Address	Section/Township/Range	A/HC	Acquired by HC	MicroStation	1:1	35 files	As Changed	Building and Safety and Records
Public Works & Utilities	Adjacent Counties								
Public Works & Utilities	Aerial photo hardcopy (several hundred paper hard copies)								
Public Works & Utilities	Aerials - 1997-99 BW Section Tiles								
Public Works & Utilities	Aerials - 2002 Color Section Tiles								
Public Works & Utilities	Aerials - Mosaic of 2002 color aerials								
Public Works & Utilities	Airports and Private Airfields								
Public Works & Utilities	Alleys (PW&U: dgn)								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	Antelope Valley Redevelopment Area Boundary								
Public Works & Utilities	Antelope Valley Road and Waterway (UDD - .dgn)								
Public Works & Utilities	Ashland Air Relief Valves								
Public Works & Utilities	Ashland Cathodic Protection Facilities								
Public Works & Utilities	Ashland Metering Test Stations								
Public Works & Utilities	Ashland Pipe Line River Crossings								
Public Works & Utilities	Ashland Pipe Line Road Crossings								
Public Works & Utilities	Ashland Well Field Valves								
Public Works & Utilities	Buffered Area for Existing Fire and Rescue Stations								
Public Works & Utilities	Buffered Area for Existing Fire and Rescue Stations with Trucks Assigned								
Public Works & Utilities	Cadastral (subdivisions, parcels, etc.)								
Public Works & Utilities	Cell Phone Towers								
Public Works & Utilities	Central Business District Boundary								
Public Works & Utilities	CIP	Parcels	HC				7	Sporadically	Public Works & Utilities
Public Works & Utilities	CIP	Parcels					10		
Public Works & Utilities	CIP Projects for Each Department								
Public Works & Utilities	City and County Zoning Districts								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	City Council Districts								
Public Works & Utilities	City of Lincoln Three Mile Zoning Jurisdiction								
Public Works & Utilities	City Street Markings (PW&U: dgn)								
Public Works & Utilities	City Street Pavement Status (PW&U: dgn)								
Public Works & Utilities	Collector Pipe Lines								
Public Works & Utilities	Communication Towers (PW&U: shp)								
Public Works & Utilities	Corporate Limits of Cities and Villages (IMS Application)								
Public Works & Utilities	County Elevation Relief								
Public Works & Utilities	County Engineer Paving Districts								
Public Works & Utilities	County-wide Topographic File (DRG Format)								
Public Works & Utilities	Data/Communication Lines throughout Lincoln (PW&U: shp)								
Public Works & Utilities	Existing Fire and Rescue Stations								
Public Works & Utilities	Existing Street Right-of-Way								
Public Works & Utilities	Fiber Optics (PW&U: dgn)								
Public Works & Utilities	Fire Stations								
Public Works & Utilities	Floodplain								
Public Works & Utilities	Floodplain coverage								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	Floodplain Easements (PW&U: shp)								
Public Works & Utilities	Future City Street Improvements								
Public Works & Utilities	Future County Road Improvements								
Public Works & Utilities	Future County Trails								
Public Works & Utilities	Future Land Use Plan: City and County								
Public Works & Utilities	Future Land Use Plans: Incorporated Towns and Villages								
Public Works & Utilities	Future Parks								
Public Works & Utilities	Future Street Right-of-Way								
Public Works & Utilities	Future Tier 1 and 2 Street Right –of-Way (shp)								
Public Works & Utilities	Future Urban Service Limit								
Public Works & Utilities	Gas Pipelines								
Public Works & Utilities	Golf Courses								
Public Works & Utilities	GPS and Survey Control Points w/State Plane and County Grid Coordinates								
Public Works & Utilities	Heart of Lincoln Neighborhoods								
Public Works & Utilities	Historic Districts								
Public Works & Utilities	Homeowner Associations								
Public Works & Utilities	Impact Fee Collection/ Programming Districts (PW&U: shp)								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	Impervious area for selected non-residential areas (PW&U: shp)								
Public Works & Utilities	Land Base (Legal Lots) - "Appended" cover as a unified file								
Public Works & Utilities	Land Base (Legal Lots) - 864 Sections for Lancaster County								
Public Works & Utilities	Land Base/Legal Lots (PW&U: dgn)								
Public Works & Utilities	Land Evaluation and Site Assessment (LESA) (1)								
Public Works & Utilities	Land Evaluation and Site Assessment (LESA) (2)								
Public Works & Utilities	Land Base	Section/Township/Range	A/HC	Acquired by HC; Paper storage	MicroStation	1:1	359 files	As Changed	Planning; County Engineer; Real Estate; Reg. Deeds
Public Works & Utilities	LES Easements								
Public Works & Utilities	LES Map Grid/Service Area Boundary								
Public Works & Utilities	LIDAR (3-meter)								
Public Works & Utilities	LIDAR Data (1-meter)								
Public Works & Utilities	Lincoln Annexations								
Public Works & Utilities	Lincoln City and County Village Limits (County Engineer)								
Public Works & Utilities	Lincoln City Limits (Current)								
Public Works & Utilities	Lincoln City Limits: 1950								
Public Works & Utilities	Lincoln City Limits: 1960								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	Lincoln City Limits: 1970								
Public Works & Utilities	Lincoln City Limits: 1980								
Public Works & Utilities	Lincoln City Limits: 1990								
Public Works & Utilities	Lincoln City Limits: 2000								
Public Works & Utilities	Lincoln Municipal Airport Environs								
Public Works & Utilities	Lincoln Municipal Airport Flight Approach Zones								
Public Works & Utilities	Lincoln Municipal Airport Noise Contours								
Public Works & Utilities	Lincoln Urban Area								
Public Works & Utilities	LPS Building Floor Plans (one file per school in .dgn format)								
Public Works & Utilities	LPS District Boundary								
Public Works & Utilities	LPS Elementary Attendance Areas								
Public Works & Utilities	LPS Elementary Site Locations								
Public Works & Utilities	LPS High School Attendance Areas								
Public Works & Utilities	LPS High School Site Locations								
Public Works & Utilities	LPS Middle School Attendance Areas								
Public Works & Utilities	LPS Middle School Site Locations								
Public Works & Utilities	LPS Site Plans (one file per school in .dgn format)								
Public Works & Utilities	Major Streets (IMS Application)								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	Markings	Section/Township/Range	A/HC	Acquired by HC	MicroStation	1:1	143 files	As Changed	Construction Drawings; Records
Public Works & Utilities	Monitor Wells								
Public Works & Utilities	New High Schools Design Files (PW&U: dgn)								
Public Works & Utilities	OPPD Ashland Area Power Lines and Circuits								
Public Works & Utilities	Ownership Parcels as Countywide PGDB								
Public Works & Utilities	Ownership Parcels as Single Shapefile								
Public Works & Utilities	Ownership Parcels by Section								
Public Works & Utilities	Parcel								
Public Works & Utilities	Parcels (IMS application)								
Public Works & Utilities	Park Land								
Public Works & Utilities	Parks (PW&U: dgn)								
Public Works & Utilities	Parks Shapefile								
Public Works & Utilities	Parks, Schools, Parcels, and City Limits (polygons - refined by LPD for geocoding purposes)								
Public Works & Utilities	Paving	Section/Township/Range	A/HC	Acquired by HC; Paper storage	MicroStation	1:1	295 files	As Changed	Construction Drawings; County; City; State; Records
Public Works & Utilities	Planned Unit Developments (PUDs)								
Public Works & Utilities	Potential Flood Zone								
Public Works & Utilities	Production Wells								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	Proposed Five-year Road and Bridges Plan (Separate coverage for each year)								
Public Works & Utilities	Proposed next fiscal year road and bridge projects								
Public Works & Utilities	Public Buildings (PW&U: shp)								
Public Works & Utilities	PW/U Coliform Zone Boundaries								
Public Works & Utilities	PW/U Water Pressure Zones								
Public Works & Utilities	PW /U Water Sampling Sites								
Public Works & Utilities	Rail Lines								
Public Works & Utilities	Residential Subdivisions								
Public Works & Utilities	RTSD Railroad Crossings (PW&U: dgn)								
Public Works & Utilities	Rural Fire Districts								
Public Works & Utilities	Rural Water Districts								
Public Works & Utilities	Salt Creek Tiger Beetle Protection Areas (shp)								
Public Works & Utilities	Sanitary Sewer Mains								
Public Works & Utilities	School Districts								
Public Works & Utilities	Sectional Maps (Hard Copy, 8.5 x 11)								
Public Works & Utilities	Situs Addresses (PW&U: dgn)								
Public Works & Utilities	Soils (PW&U)								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	South Beltway (PW&U: dgn)								
Public Works & Utilities	Specialty Maps	Varies	A/HC	Paper storage	MicroStation	1:1		As Changed/ Requested	Records
Public Works & Utilities	Speed Zones (PW&U: dgn)								
Public Works & Utilities	StarTran Fixed Route System								
Public Works & Utilities	Storm Drainage								
Public Works & Utilities	Storm Sewer	Section/Township/Range	A/HC	Acquired by HC; Paper storage	MicroStation	1:1	251 files	As Changed	Construction Drawings; Records
Public Works & Utilities	Storm Sewer Foremans	1 Mile NS; 2 Mile EW	A/HC	Paper storage	MicroStation	1:400	78 files	As Changed	Construction Drawings; Records
Public Works & Utilities	Storm Water Data (PW&U: dgn)								
Public Works & Utilities	Storm Water Projects (PW&U: dgn)								
Public Works & Utilities	Streams (PW&U: shp)								
Public Works & Utilities	Street Resurfacing Status (PW&U: shp)								
Public Works & Utilities	Streets (IMS Application)								
Public Works & Utilities	Streets (PW&U: shp)								
Public Works & Utilities	Streets Coverage								
Public Works & Utilities	Subdivision plats (hard copies w/various scales, sources, and conditions)								
Public Works & Utilities	Ten Foot and Two Foot Contour Lines (PW&U: shp)								
Public Works & Utilities	Ten foot contours topo interval appended as a single, unified file								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	Ten foot contours topo intervals – at the Township level (24 coverages)								
Public Works & Utilities	Topographic Contour Lines (PW&U: dgn)								
Public Works & Utilities	Township level GPS and survey control points in 'point coverage' format								
Public Works & Utilities	Traffic	Section/Township/Range	A/HC	Acquired by HC	MicroStation	1:1	110 files	As Changed	Construction Drawings; Records
Public Works & Utilities	Traffic Markings and Lighting (PW&U: dgn)								
Public Works & Utilities	Transmission Line Air Relief Valves								
Public Works & Utilities	Transmission Line Cathodic Protection								
Public Works & Utilities	Transmission Line Check Valves								
Public Works & Utilities	Transmission Line Metering Test Stations								
Public Works & Utilities	Transmission Line Valves								
Public Works & Utilities	Transmission Pipe Lines								
Public Works & Utilities	Valves								
Public Works & Utilities	Wastewater	Section/Township/Range	A/HC	Acquired by HC; Paper storage	MicroStation	1:1	223 files	As Changed	Construction Drawings; Records
Public Works & Utilities	Wastewater Foremans	1 Mile NS; 2 Mile EW	A/HC	Paper storage	MicroStation	1:400	72 files	As Changed	Construction Drawings; Records; Wastewater Division
Public Works & Utilities	Wastewater Utilities (PW&U: dgn)								
Public Works & Utilities	Wastewater Utilities: Foreman Maps								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Public Works & Utilities	Water	Section/Township/Range	A/HC	Acquired by HC; Paper storage	MicroStation	1:1	241 files	As Changed	Construction Drawings; Records
Public Works & Utilities	Water Foremans	1 Mile NS; 2 Mile EW	A/HC	Paper storage	MicroStation	1:400	89 files	As Changed	Construction Drawings; Records; Water Division
Public Works & Utilities	Water Foreman's Maps								
Public Works & Utilities	Water Mains								
Public Works & Utilities	Water Utilities (PW&U: dgn)								
Public Works & Utilities	Water Utilities (PW&U: shp)								
Public Works & Utilities	Wilderness Park: Boundary								
Public Works & Utilities	Wilderness Park: Salt Creek and Tributaries								
Urban Development	Aerials - Mosaic of 2002 color aerials								
Urban Development	Blighted Areas								
Urban Development	Cadastral (subdivisions, parcels, etc.)								
Urban Development	Census Tract Boundaries								
Urban Development	Floodplain coverage								
Urban Development	Focus Areas								
Urban Development	Land Base (Legal Lots) - 864 Sections for Lancaster County								
Urban Development	Land Base/Legal Lots (PW&U: dgn)								
Urban Development	Low-Moderate Income Areas								

Table 3-2: Existing Maps and Drawings (continued)

Department/ Division	Map or Map Set Name	Base Map on which this map is compiled (e.g., topographic quad, county road map, parcel map)	Automated or Hard Copy (A or HC)	Media (e.g., digital, mylar, paper, photo, linen, sepia)	Computer Software Package (if digital)	Scale (e.g., 1" = 50', 1" = 100', 1" = 500')	Number of Maps in Set and Geographic Coverage	Update Cycle (e.g., daily/weekly/ monthly/annually/ sporadically)	Source Agency/ Maintained by?
Urban Development	Neighborhood Association Boundaries								
Urban Development	Parcel								
Urban Development	Redevelopment Area Maps								
Urban Development	Streets								
Urban Development	Tenure of City of Lincoln Parcels								
Urban Development	TIF District Boundaries								
Weed Control Authority	Aerials		A						
Weed Control Authority	Base Map Data (streets/parcels)		A						
Weed Control Authority	Lancaster County Noxious Weed Infestations		A					Sporadically	County Assessor; Weed Control
Weed Control Authority	Noxious Weed Inspection Map	Parcels; Street; Aerial; Weed	A			1:50 to 1:660	1300	Sporadically	County Assessor; County Engineer; Public Works; Planning; Weed Control
Weed Control Authority	Soils		A						
Weed Control Authority	Weed Abatement Inspection Map		A				1800	Daily	County Assessor

3.4.2 Tabular Data

Table 3-3 lists and describes the tabular data currently being utilized by the City of Lincoln/Lancaster County, either automated or manual, and provides details about each data set. Once automated and updated, any of these data sets that have a geographic reference associated to them such as an address, parcel number, or x-y-z coordinate can be integrated with a digital map of the City/County that will allow for data visualization and geographic analysis.

Key data sets to be integrated into the Enterprise GIS follow. Again, each of these data sets was mentioned in several departments as necessary to workflow.

Databases

- Census Data
- Deeds
- Fixed Asset Inventory
- Permits
- Special Assessments
- Noxious Weeds
- Health Statistics
- Work Orders
- Assessment Records
- Ownership
- Tax Role
- Addresses.

Table 3-3: Existing Data Sets

Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	If Automated: Computer Model and Operating System	If Automated: Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
Building and Safety	Addresses	9,000	A	Parcel		Windows XP		Daily	Building and Safety
Building and Safety	Board of Zoning Appeals	2,500	A	Parcel		Windows XP		Monthly	Building and Safety
Building and Safety	Group Home	45	A	Parcel		Windows XP		Sporadically	Building and Safety
Building and Safety	Group Home Buffer	45	A	Parcel		Windows XP		Sporadically	Building and Safety
Building and Safety	Special Permits	3,500	A	Land Base		Windows XP	ArcView 3.x; ArcMap 8.x	Weekly	Building and Safety
County Assessor/ Register of Deeds	CAMA Data (Assessor)	102,700	A	Parcel Number		Mainframe	Oasis CAMA	Daily	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Current TIF districts	1,500	A	Parcel Number		Mainframe	Oasis CAMA	Sporadically	County Assessor/ Register of Deeds
County Assessor/ Register of Deeds	Deeds by Instrument Number (Scanned Images)		A						
County Assessor/ Register of Deeds	Metadata Creation								
County Assessor/ Register of Deeds	Tax Increment Financing (TIF) Districts								
County Engineer	Basins								
County Engineer	Bridge/culvert		A				Cartegraph		
County Engineer	Cotics1	1	A	County Coordinates		Unix and Windows XP	ArcInfo 7.x and ArcGIS 8.x	As Needed	County Engineer
County Engineer	Cotics2								
County Engineer	County (outside Lincoln City Limit) Street Closings								
County Engineer	Deeds by Instrument Number (Scanned Images)								County Assessor/ Register of Deeds

Table 3-3: Existing Data Sets (continued)

Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	If Automated: Computer Model and Operating System	If Automated: Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
County Engineer	Dwelling Unit Photos (Scanned Images for Web)								County Assessor/ Register of Deeds
County Engineer	Field Notes (legal descriptions of irregular tracts)	Numerous	A	Section, Township, Range		Windows XP	Web Browser	As Needed	County Engineer
County Engineer	Hardcopy Village Street Maps (pdf)	11	A	Section, Township, Range		Windows XP	Adobe Acrobat	As Needed	County Engineer
County Engineer	Lanculv								
County Engineer	Lincoln School Building Footprints								
County Engineer	Links Added: GIS Division, Map Shop, Surveys, Field Notes, Platbooks, etc.	1	A	Various		Windows XP	Text Editor	As Needed	County Engineer
County Engineer	Major Streets Subset - Centerlines with Refined Annotation								
County Engineer	Major Streets within General Urban Area								
County Engineer	Metadata Creation								
County Engineer	National Wetlands Inventory								
County Engineer	Numerous Data Sets not on the County Server								
County Engineer	Plan Holders and Bidders Pick-up Lists	1	A	Project Number		Windows XP	Text Editor	As Needed	County Engineer
County Engineer	Plats and Subdivisions (Scanned Images)								County Assessor/ Register of Deeds
County Engineer	Processed GPS control in original format (spreadsheet format)	24	A	County Coordinates		Windows XP	Microsoft - Excel 2000	As Needed	County Engineer
County Engineer	Published/Printed County Roads Map	1	HC	Section, Township, Range	Paper			As Needed	County Engineer

Table 3-3: Existing Data Sets (continued)

						If Automated			
Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	Computer Model and Operating System	Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
County Engineer	Published/Printed Version of City of Lincoln roads								
County Engineer	Rds. Traffic count links								
County Engineer	Scanned Surveys	Numerous	A	Section, township, range		Windows XP	Web Browser	As Needed	County Engineer
County Engineer	Sign Asset Themes								
Fire and Rescue	Hazmat Information		A/HC						
Health	Air Emission Sites								
Health	Animal Control Dispatches								
Health	Birth and Death Data								
Health	Body Art Practitioners								
Health	Census Block Group Data								
Health	Census Tract Data								
Health	Community Recreation Facilities								
Health	Elevated Blood Lead Levels								
Health	Emergency Response								
Health	Licensed Childcare Sites								
Health	Licensed Food Handlers								
Health	Medical Facilities								
Health	Neighborhood Associations								
Health	Restaurants								
Health	Saline Wetlands								
Health	Septic Systems								
Health	Standing Water (Mosquito Breeding Sites)								

Table 3-3: Existing Data Sets (continued)

						If Automated			
Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	Computer Model and Operating System	Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
Health	Tobacco Sales to Minors								
Health	Wells								
Information Services	Canada Thistle (Weed Control)								
Information Services	Combined Use Permits and Special Permits								
Information Services	Leafy Spurge (Weed Control)								
Information Services	Musk Thistle (Weed Control)								
Information Services	Nebraska Capitol Environs District								
Information Services	Nebraska Capitol View Corridors								
Information Services	Plumeless Thistle (Weed Control)								
Information Services	Preexisting Use Permits								
Information Services	Purple Loosestrife (Weed Control)								
Lincoln Electric System (LES)	Blighted Areas								
Lincoln Electric System (LES)	LES Construction Reference Drawings								
Lincoln Electric System (LES)	LES-owned Property								
Lincoln Electric System (LES)	Major Streets Subset - Centerlines with Refined Annotation		A			Windows 2000	Appia-InfoTech Construction Management	Annually	
Lincoln Electric System (LES)	Major Streets within General Urban Area								
Lincoln Electric System (LES)	Saline Wetlands		A			Windows 2000	Appia-InfoTech Construction Management	Semi-annually	

Table 3-3: Existing Data Sets (continued)

Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	If Automated: Computer Model and Operating System	If Automated: Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
Lower Platte South Natural Resources District (LPSNRD)	Antelope Valley Redevelopment Area Projects								
Lower Platte South Natural Resources District (LPSNRD)	Metadata Creation								
Lower Platte South Natural Resources District (LPSNRD)	Plats and Subdivisions (Scanned Images)								
Parks and Recreation	Adopt a Trail								
Parks and Recreation	Census Data								
Parks and Recreation	Memorial and Donations								
Parks and Recreation	Rental Shelters								
Parks and Recreation	Tree Count								
Planning	Airport Data								
Planning	Approved Use Permits		A	City		Windows XP	Lotus 123	Sporadically	Planning
Planning	Census Block Group Data		A	County		Windows XP	ArcGIS 9.0	Decennial	Planning
Planning	Census Tract Data		A	County		Windows XP	ArcGIS 9.0	Decennial	Planning
Planning	Census Tract Data		A	Census Tracts		Windows XP	ArcGIS 9.0	Decennial	Planning
Planning	CIP Projects for Each Department		A	City		Windows XP	Lotus 123	Sporadically	Planning
Planning	Community Unit Plans (CUPs)		A	City		Windows XP	Lotus 123	Monthly	Planning
Planning	Elderly/Retirement Housing		A	City		Windows XP	Lotus 123	Sporadically	Planning
Planning	Residential Vacant Lot Inventory		A	City		Windows XP	Lotus 123	Sporadically	Planning
Planning	Residential Vacant Lot Inventory		A	City		Windows XP	ArcGIS 9.0	Weekly	Planning
Planning	Special Permits for on and off Sales of Alcohol		A	City		Windows NT	Lotus 123	Sporadically	Planning

Table 3-3: Existing Data Sets (continued)

Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	If Automated: Computer Model and Operating System	If Automated: Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
Planning	Unbuilt Major Apartment Complexes		A	City		Windows XP	Lotus 123	Sporadically	Planning
Police	Lincoln Police Department (LPD) Substations (911 Created)								
Police	Lincoln School Building Footprints								
Police	Liquor Licenses								
Police	Low-Moderate Income Area (2000)								
Police	Major Streets Subset - Centerlines with Refined Annotation								
Police	Major Streets within General Urban Area								
Police	Neighborhood Associations								
Police	Neighborhood Revitalization Strategy Area								
Police	Police Dispatch Records								
Police	Police Incident Reports								
Police	Rectangular Mask with City of Lincoln Removed								
Police	Registered Sex Offenders								
Police	Waterways (LPD)								
Public Works & Utilities	Addresses (LPD)								
Public Works & Utilities	Antelope Valley Redevelopment Area Projects								
Public Works & Utilities	Ashland Plant Buildings								

Table 3-3: Existing Data Sets (continued)

Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	If Automated: Computer Model and Operating System	If Automated: Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
Public Works & Utilities	Blighted Areas								
Public Works & Utilities	Cartegraph Asset Management								
Public Works & Utilities	Community Recreation Facilities								
Public Works & Utilities	County (outside Lincoln City Limit) Street Closings								
Public Works & Utilities	Deeds by Instrument Number (Scanned Images)								
Public Works & Utilities	Drainage Basins								
Public Works & Utilities	Drainage Structures along Salt Creek								
Public Works & Utilities	Emergency Response								
Public Works & Utilities	Existing Land Uses in County								
Public Works & Utilities	Internet Tap Image Logs								
Public Works & Utilities	LES Construction Reference Drawings								
Public Works & Utilities	Lincoln Area Public and Parochial Schools and UNL								
Public Works & Utilities	Lincoln School Building Footprints								
Public Works & Utilities	Links Added: GIS Division, Map Shop, Surveys, Field Notes, Platbooks, etc.								
Public Works & Utilities	Location of Publicly Accessible Web Cameras								

Table 3-3: Existing Data Sets (continued)

Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	If Automated: Computer Model and Operating System	If Automated: Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
Public Works & Utilities	LPS Special Program Sites (Focus Programs)								
Public Works & Utilities	LPS Student Enrollment								
Public Works & Utilities	LPS Support Buildings								
Public Works & Utilities	Major Streets Subset - Centerlines with Refined Annotation								
Public Works & Utilities	Major Streets within General Urban Area								
Public Works & Utilities	Medical Facilities								
Public Works & Utilities	MP2 Maintenance Database								
Public Works & Utilities	N. 27th Street Redevelopment Area								
Public Works & Utilities	Nebraska Capitol Environs District								
Public Works & Utilities	Neighborhood Associations								
Public Works & Utilities	Neighborhood Revitalization Strategy Area								
Public Works & Utilities	Plan Holders and Bidders Pick-up Lists								
Public Works & Utilities	Plats and Subdivisions (Scanned Images)								
Public Works & Utilities	Public Libraries								
Public Works & Utilities	PW Meter Reading Cycle Calendar								
Public Works & Utilities	RBASE Wastewater Maintenance Record								
Public Works & Utilities	Saline Wetlands								
Public Works & Utilities	Septic Systems								
Public Works & Utilities	Streets								

Table 3-3: Existing Data Sets (continued)

Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	If Automated: Computer Model and Operating System	If Automated: Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
Public Works & Utilities	Traffic Counts/Travel Time Studies								
Public Works & Utilities	Traffic Zones								
Public Works & Utilities	Unbuilt Major Apartment Complexes								
Public Works & Utilities	Undeveloped LPS Sites								
Public Works & Utilities	Urban Growth Tier 1								
Public Works & Utilities	Urban Growth Tier 1 Priority Areas								
Public Works & Utilities	Urban Growth Tier 2								
Public Works & Utilities	Urban Growth Tier 2 Priority Areas								
Public Works & Utilities	Urban Growth Tier 3								
Public Works & Utilities	Urban Planning Zones								
Public Works & Utilities	Wastewater Sampling DB								
Public Works & Utilities	Waterways (LPD)								
Public Works & Utilities	Wells								
Public Works & Utilities	Zip Codes								
Urban Development	1990 Census data by tract for SF1 tables								
Urban Development	1990 Census data by tract for SF3 tables								
Urban Development	2000 Census data by track for SF1 tables								
Urban Development	2000 Census data by tract for SF3 tables								
Urban Development	Antelope Valley Redevelopment Area Boundary								
Urban Development	Antelope Valley Redevelopment Area Projects								
Urban Development	Blighted Areas								

Table 3-3: Existing Data Sets (continued)

Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	If Automated: Computer Model and Operating System	If Automated: Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
Urban Development	Census Block Group Data								
Urban Development	Census Tract Data								
Urban Development	Current TIF Districts								
Urban Development	Downtown and Haymarket Redevelopment Plan Boundary								
Urban Development	Downtown and Haymarket Redevelopment Project Boundaries								
Urban Development	Expired Tax Increment Financing Areas (TIF)								
Urban Development	Havelock Redevelopment Area								
Urban Development	Low-Moderate Income Area (1990)								
Urban Development	Low-Moderate Income Area (2000)								
Urban Development	N. 27th Street Redevelopment Area								
Urban Development	Neighborhood Associations								
Urban Development	Neighborhood Revitalization Strategy Area								
Urban Development	Overlapping Neighborhood Association - Witherbee								
Urban Development	Overlapping Neighborhood Association Hawley								
Urban Development	Saline Wetlands								

Table 3-3: Existing Data Sets (continued)

Department/ Division	Record or Data Set Name	No. of Records or Entries	Automated or Hard Copy (A or HC)	Geographic Reference (e.g., facility ID, address, parcel no.)	Hard Copy Media (paper, microfiche, card file)	If Automated: Computer Model and Operating System	If Automated: Software Package or Packages	Update Cycle (e.g., daily, weekly, monthly, annually, sporadically)	Source Department or Outside Organization
Urban Development	Tax Increment Financing (TIF) Districts								
Weed Control Authority	Current Inspections	Tied to Weed DB	A	ID; Address; Parcel Num; Owner			Oracle; Web Accessible	Daily	Information Services
Weed Control Authority	Weeds Database	43,471 (3,000 new/yr.)	A	ID; Address; Parcel Num; Owner			Oracle	Daily	Information Services
Weed Control Authority	Work Order		A				Oracle		

Note to COL/LC: The tables above are an aggregation of data from both our survey and ESRI's. If something is in error, it is very important that we receive comment. The inclusion of these tables is to provide a framework for development of the enterprise geodatabase and also to identify areas beyond the three key workflows where cost recovery or avoidance may be realized during program implementation.

SECTION 4
CONCEPTUAL DESIGN

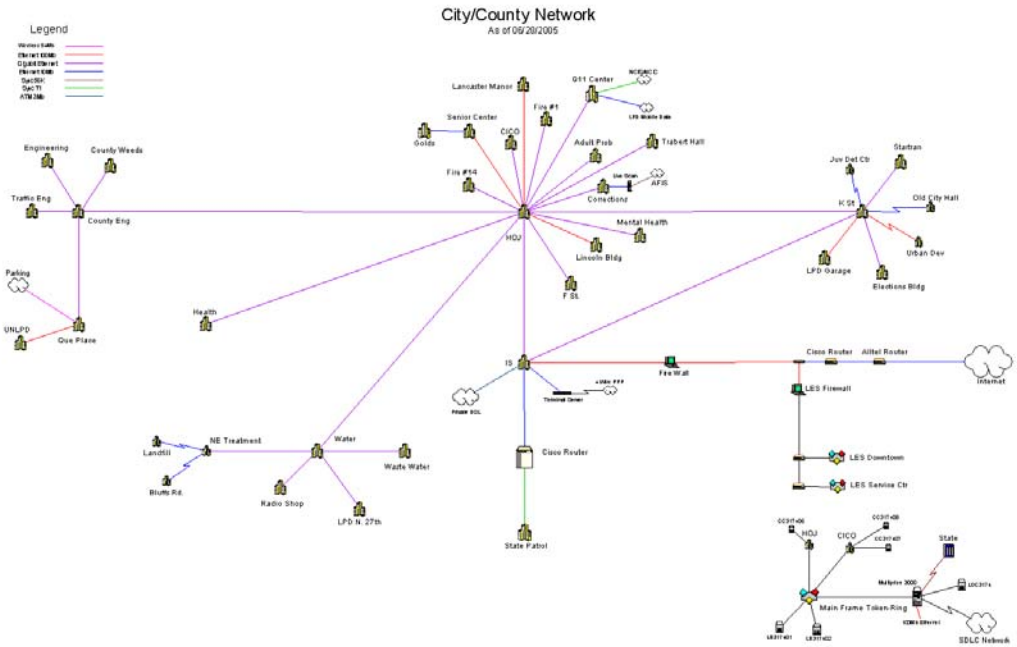
4.1 INTRODUCTION

This section provides a description of the proposed GIS system and its components. The system design addresses the requirements identified in the data gathering. The core software includes ESRI GIS software and Oracle database management components and provides capabilities for Web-based services available throughout divisions in the City, County, and other regional participants.

4.2 CONFIGURATION ARCHITECTURE

The Information Services Division will continue to maintain and manage the GIS infrastructure as it transitions from departmental programs to an enterprise GIS. As such, the configuration architecture is not anticipated to change drastically. System expansions may be necessary as usage increases. The GIS Technology Migration Plan prepared by ESRI provides metrics for system requirements and can be used as a reference as usage of the system increases. Figure 4-1 illustrates the existing system architecture.

Figure 4-1: Overview of Existing System Configuration



4.3 SOFTWARE

The software suite proposed for the enterprise GIS is designed around two closely related products—1) the ESRI GIS software itself, and 2) Oracle, a relational database management system (RDBMS). The GIS software handles the map graphic data and the spatial operations for retrieval, analysis, and map display. ArcIMS software will be used to publish map and geographic data for availability through Web browsers and other Web tools.

The RDBMS will manage all attribute data and, depending on the software selected, may also manage the graphic map data. The RDBMS will provide powerful tools for query, reporting, security, and data management.

The applications will be developed in an appropriate programming language such as Java and will draw on the capabilities of the ESRI and Oracle tools. A separate project performed by Environmental Systems Research Institute identified the strategy for implementing current software solutions. The reader is encouraged to reference that report for a more detailed view of ESRI software implementation for enterprise GIS in the City of Lincoln and Lancaster County. This portion of the conceptual design provides an overview of software use based upon the needs of the regional participants and the suggestions offered in the ESRI report.

Enterprise GIS implementation will rely upon the use of a suite of GIS software products. A number of software products will be necessary to meet the enterprise requirements. These requirements have been categorized based upon different anticipated uses for the software. These uses include:

- Web-based GIS
- Desktop GIS
- Mobile Mapping.

4.3.1 Web-based GIS

Many users of GIS data and mapping in the City of Lincoln and Lancaster County currently access and will continue to access GIS through a Web-based application. Currently, this is an ArcIMS application. However, in the future, this could also be an ArcServer application. These visualization and analysis applications typically enable users to view, query, and manipulate GIS data. The Web-based GIS applications may be used to provide a variety of functional capabilities that include the following:

- Visualization Capabilities
  - – Generate maps in raster or vector format
  - – Transport and render maps via the Web using scalable vector graphics
  - – Query a database and visualize information in the form of a map

  - Click on a map feature or area and retrieve attribute data
  - Navigate through spatial data sets with simple interfaces
  - Create thematic mapping
  - Generate labels
- Analysis Tools
  - Perform spatial queries
  - Generate buffer zones
  - Create point-to-point routes
- Scalable Architecture
- Interoperable Access to Geospatial Data
- Metadata Creation and Query Tools
- Utilities for Administering the Software Product on a Web Server.

4.3.2 Desktop GIS

Desktop GIS applications are used to fully support a user who is responsible for creating, editing, and maintaining spatial data. They may also be used for viewing and querying spatial data. Currently, ArcGIS is the primary software product being used for desktop GIS. ArcGIS provides the following functionalities.

Data Capture and Maintenance

The selected software product should provide productivity tools for geospatial data capture. These tools should include the following construction aids:

- Angle, bearing, and azimuth
- Segment length
- Perpendicular to and from
- Place perpendicular from
- Orthogonal placement
- Parallel and offset placement
- Place at a distance along a feature
- Place at a distance and direction from a feature.

Editing tools that include the following capabilities:

- Modify geometry
- Redigitize geometry
- Move or rotate a feature
- Delete a feature(s)

- Copy feature
- Copy parallel
- Merge and split features
- Change feature class
- Partial delete
- Reverse direction
- Maintain relationships in feature placement and editing.
- Precision key-in of coordinates
- Snapping to features
- Integrated raster/vector snap
- Multi-level undo/redo.

Other functions necessary for data capture and maintenance include the following:

- Image registration
- Rubbersheeting
- Automatic population of attribute values
- Calculate attributes
- Collect attributes when placing features
- Bulk attribute update
- Copy attributes
- Picklist support.

Besides ArcGIS, a couple of other options are available to the City of Lincoln/Lancaster County GIS users. ArcReader is a simple GIS application used primarily for viewing and querying spatial data. ArcEngine can also be used to develop desktop applications as well. These desktop applications may be stand-alone applications, embedded applications, or they can be client applications to ArcServer. The *Technology Migration Strategy* prepared by ESRI should be referenced for more detail on the use and applicability of these software products.

Interoperability and Data Access

The ESRI ArcGIS software product supports the integration of multiple spatial data formats into one user view of the data. Supported formats include Microsoft Access, Oracle, Microsoft SQL Server, shapefiles, and .dgn and .dwg, as well as all standard raster formats.

It should also provide flexible import and export utilities for sharing facility data, including network models. These import and export functions will enable the user to move data to external analysis packages.

Data Analysis

ArcGIS provides robust analysis tools to conduct spatial analyses between multiple geospatial databases. Data analysis tools allow the end user to combine multiple

operations into a single analysis model to address complex spatial questions. Through database query and analysis tools, the user will immediately visualize analysis results. Specific analysis functions that are supported by ArcGIS include:

- "What if" analysis support
- Attribute and spatial query
- Buffer zoning
- Spatial intersection
- Spatial difference
- Analytical merge
- Aggregation
- Dynamic segmentation
- Address geocoding
- Measure tools
- Network trace.

Data Presentation

ArcGIS provides layout composition tools to present data and create maps according to unique needs. These tools and functions include:

- High quality cartographic display
- Quick map generation tools
- Extensive map composition environment
- Thematic mapping tools
- Manual text placement
- Automatic label generation
- Cartographic grid placement
- Reference index grids.

Extensibility

Additional functionality is available through extension products and integration with third party software applications.

4.3.3 Mobile Mapping and Field Data Collection

Through mobile mapping and field data collection, City and County staff will be able to realize a number of operational efficiencies. Components of a mobile mapping implementation can include the mobile computer device, optional GPS, and wireless communications and software.

Software requirements for mobile mapping are similar to desktop GIS requirements. In fact, some workers may require the full functionality of a desktop GIS product while working in the field. However, most field employees will need a more streamlined

functionality that is simple to use. The necessary functions for a mobile mapping application include the following:

- Support for industry standard vector and raster image display
- Creating and editing spatial data using input from the mouse pointer, pen, or GPS
- Map navigation, including pan and zoom, spatial bookmarks, and center on current GPS location
- Data query to identify features, display hyperlinks, and locate features
- Map measurement of distance, area, and bearings
- GPS navigation (optional)
- Application development templates to automate GIS fieldwork.

4.4 APPLICATIONS

Participants in the master planning effort have identified a number of new GIS applications they would like to see implanted. These are listed below in Table 4-1.

Table 4-1: GIS Applications

Department	Application
Airport Authority	"Upgrades" to Assessor AMLs
Airport Authority	Integration with Security Systems
Airport Authority	Tracking Aviation Easements
Building and Safety	Building Footprints
Building and Safety	GPS Building Corners
Building and Safety	Track Building Permits
Building and Safety	Track Inspections/Investigations
Building and Safety	Track Special Permits
County Engineer	Create Plat Maps
County Engineer	Determine Traffic Count
County Sheriff	Real-time Mobile Mapping
Finance/Administration	Expenditure Analysis
Finance/Administration	Parking Violation Location Mapping
Finance/Administration	Revenue/Tax Analysis
Finance/Administration	Street and Sidewalk Condition Mapping
Fire	AVL
Fire	Critical Infrastructure
Fire	Educational Presentations

Table 4-1: GIS Applications (continued)

Department	Application
Fire	Exposure Analysis
Fire	GPS
Fire	Hazmat and Detailed Building Info Linkage
Fire	Hydrant Flow and Pressure
Fire	Hydrant In/Out Service
Fire	Station Location Planning
Fire	View Demographic Data
Fire	View Preliminary Plats
Health	Addressing Standards and Validation Tools
Health	Epidemiological Analysis
Health	Standard GIS Tools with Simple Interface
Parks and Recreation	Create Interactive Park Map with Information
Parks and Recreation	GPS
Parks and Recreation	Link Digital Photos to Parks
Parks and Recreation	Map Adopt-a-Park Data
Parks and Recreation	Map Adopt-a-Trail Data
Parks and Recreation	Map Rental Shelters
Parks and Recreation	Market Parks to Public
Parks and Recreation	Tie Park Facility Information to Map
Parks and Recreation	Track Memorials/Donations
Planning	Customize ArcIMS Site
Planning	Finalize Digital Submission Standards
Planning	Identify Utility Information
Property Management	Inventory City/County-owned Properties
Property Management	Parking Study
Property Management	Right-of-Way Mapping
Public Works/Utilities	Convert Annotation
Public Works/Utilities	Link Asset Information
Public Works/Utilities	Link Customer Service Information
Public Works/Utilities	Sewer Line/Manhole Relationship
Public Works/Utilities	Street Centerline/Boundary Relationship
Public Works/Utilities	Track Right-of-Way Changes
Public Works/Utilities	Wastewater Age of Pipe

While there are a significant number of application requirements, these applications can be placed into four primary application categories that provide considerable capabilities:

- General GIS interface and query
- Data/Map maintenance
- CADD digital exchange
- Map production.

4.4.1 General GIS Interface and Query

The general GIS interface is used as a query application for use by regional participants and the community. This application provides capabilities through a Web browser for all authorized persons to query the GIS and RDBMS databases, retrieve and display data, generate map displays, and produce reports. Using the browser approach, operation of the application is very easy and powerful.

The mapping application provides users with the necessary tools to navigate throughout the spatial extents of Lancaster County. A zoom tool allows the user to zoom in and out on the map display by user-defined amounts or by standardized amounts. The application will also allow the user to zoom to previous, next, and full extents. A pan function will allow the user to move the map window and will retain the scale. Other tools should allow the user to "go to" a location based upon a feature ID or address. An identify tool should allow the user to query the database by pointing to the feature using the mouse in the map extent. The interface should provide a "map tips" function that indicates the function of a button when the user hovers the mouse over a button in the interface.

The general view of the GIS interface includes a "Table of Contents" which lists all spatial data layers available through the interface. This "Table of Contents" allows the user to define visible map layers by checking or un-checking radio buttons associated with each spatial layer.

Within the general interface, the user should be able to call a "Query by Attribute" dialogue box that will allow the user to build SQL queries interactively to select or analyze the data based upon attribution in the database.

The results of queries are presented in an information window that pops up in a separate tabular window. Similar to querying by attribute, the application should allow the user to generate reports based upon map or database queries. For example, the query might be "show me all customers within 100 feet of this proposed improvement." The correlating report might be a list of all customers, including mailing addresses.

The application should provide a Help function that allows the user to search for functions by the contents of an on-line user guide, by a key word index, or through an answer wizard. This is a critical design element since many City of Lincoln and Lancaster County participants expressed a need for a strong training program.

4.4.2 Data/Map Maintenance

Data maintenance is vital. Currently, most data maintenance is performed using CADD tools. However, standard functions provided by desktop GIS software and a relational database management system increasingly provide the functions required for data and map maintenance. Over time, GIS maintenance will be conducted using ArcGIS and customized extensions to the product, which is being done in the County Assessor and Engineer's Offices.

Customization of ArcGIS will be necessary to reduce the number of keystrokes or mouse clicks required to make a specific type of map or attribution addition or edit. The Data/Map Maintenance Application may also be customized to provide quality control during data entry. For example, a custom data/map maintenance application may generate a dialogue box when a user enters a new feature. This dialogue box will prompt the user to complete attribution for that feature and will provide pick lists for attributes that have domains defined in the database design. The application may also capture feature-level metadata as a user completes edits to the database.

4.4.3 Computer Aided Drafting and Design (CADD) Digital Exchange

The use of CADD is a daily function in many City of Lincoln and Lancaster County divisions. CADD tools are used to create GIS data, construction plans, and shop drawings. Proper integration of CADD with GIS will allow the City and County to maximize the use of this data. This digital exchange may occur at several different points of data creation and integration.

4.4.4 Map Production

Map production applications facilitate the generation of hard copy maps. A number of standard map products are and may be defined to provide operational efficiencies. These standard map products will have established data, annotation, plot sizes, scales, symbology, map legend, and disclaimers.

The application should also allow the operator to create user-defined map products by specifying the map and annotation data to be displayed; set the size, scale, and other cartographic operations; and incorporate a legend, north arrow, scale bar, City and County logos, or other border or title information.

Map production tools are available in all of the desktop GIS product environments previously referenced. Customization will need to be done to define the standard map products.

Map production can potentially be added to the general GIS interface. This functionality would require additional design based upon the software environment selected.

4.5 ORGANIZATION AND STAFFING

The organizational structure and staffing has been described conceptually in the Visioning Technical Memorandum. This Technical Memorandum has been included in this document as Appendix A.

4.6 MANAGEMENT PROCEDURES

A number of management procedures are in place that are de facto standards. These practices should be formally defined to address the following areas:

- System Management – Monitoring system performance, resolving problems, analyzing and determining requirements for new or replacement components, and managing contracts and agreements with vendors.

- Database Administration – Maintenance and update of the GIS data model, tuning and optimization of the model, data quality assurance, monitoring of update and maintenance of data, and consultation with data users.

- Customer/User Liaison – Assistance, problem resolution, and evaluation of requests for enhancements.

SECTION 5
IMPLEMENTATION STRATEGY

The ongoing development of GIS in the City of Lincoln/Lancaster County will have several phases over the next five years. GIS usage has been an important component in government operations. In order to maximize that benefit, the creation of an enterprise GIS will need to go through an initiation phase that will set the foundation for the enterprise. This initiation phase will include extension of interlocal agreements, creation of a GIS division in the City/County Planning Department, and an enterprise database design.

Those developments will facilitate an implementation phase where the real "excitement" begins. Enterprise data will be loaded into the repository, and maintenance of that data will follow more streamlined workflows. The existing ArcIMS applications will be extended to provide additional functionality. End users will become more proficient in the use of geospatial technologies.

Through that proficiency, the City, County and other participants can move into the operations stage of GIS development. During that phase, staff members are enabled to bring forward their own work process improvements based upon the geospatial technologies developed during the transition and implementation phases.

The strategic implementation approach to those three phases is described in this section.

5.1 ENTERPRISE GIS INITIATION

The primary focus of the initiation phase of the enterprise GIS program is the establishment of an organizational structure and hiring of necessary staff. Creation of a structure will ensure that the program has accountability, roles are defined, and funding is specified. During this phase, policies will also be established. The design of the enterprise spatial repository will also be a critical element during the Enterprise GIS initiation.

5.1.1 Organization

Structure

GIS Program Management Office

The Visioning Technical Memorandum in Appendix A presents the concept of a GIS Program Management Office. This Office is to be located in the City/County Planning Department. The GIS Program Management Office will need to be staffed with several personnel. The creation of this Office will need to be accomplished through modifications to the existing interlocal agreement between the City and County.

One of the first activities in the initiation phase will be the selection and hiring of the GIS program manager. All of the participants identified a critical need for a program manager who would be responsible for implementing the strategic direction identified by the GIS Committee and who would ensure responsiveness to City and County staff and citizens.

The program manager will provide the essential management activities to implement and operate an enterprise GIS program. This will include project management, tracking and management of data development efforts, and specifying application development. A sample job specification for this position is provided in Figure 5-1.

Figure 5-1: Sample GIS Program Manager Job Specification

GIS Program Manager

Reports To:
City of Lincoln/Lancaster County GIS Committee

Definition

Under administrative direction, is responsible for the operational development, implementation, maintenance, and management of the enterprise GIS policies, procedures, data resources, applications and staff for the GIS Program Management Office, within the context of the enterprise GIS; performs related duties as required.

Examples of Work

- Administers the Enterprise GIS Program, including but not limited to the planning and implementation of coordinated GIS data, technology, and application investments.
- Administers and oversees centralized support for GIS.
- Prepares, monitors, and administers an annual GIS operating budget.
- Manages contracts and tasks in contracts with service providers responsible for assisting with the design, selection, integration, and implementation of GIS; provides access to resources needed for support of those contracts.
- Provides technical support for enterprise and individual department GIS initiatives. This includes researching and facilitating improvements to business processes using GIS. Ensures proper prioritization and processing of departmental requests for assistance.
- Develops, implements, and monitors training and staff development for GIS; budgets and schedules for training.
- Coordinates and develops GIS policies and program objectives to ensure that the GIS is properly implemented and maintained.
- Keeps the GIS Committee informed of all situations that could affect the accomplishment of GIS goals and objectives.
- Maintains responsibility for the accuracy and completeness of enterprise GIS data and metadata.
- Prepares documents, correspondence, and technical reports on GIS; develops operational standards, manuals, and guidelines for GIS.

Experience and Training

Bachelor's degree in Geography, Urban or Transportation Planning, Landscape Architecture, Engineering, Information Systems, or a related discipline with a significant emphasis on GIS and five years experience in the use of GIS, including at least two years of experience in the management of GIS development and implementation projects OR any combination of training and experience wherein related work experience may be substituted for up to two years of educational requirements on a one-for-one basis

Knowledge and Skills

Thorough knowledge of advanced GIS principles and practices. Knowledge of programming techniques for geographic analyses, basic cartography, and methods and standards for data collection and analysis. Knowledge of the use of GIS software programs implementation, maintenance, and operation. Knowledge of relational database management systems design, development, and administration. Skill to meet project deadlines. Skill in public speaking. Strong ability to present technical information. Ability to negotiate contracts. Ability to analyze and solve problems. Ability to plan, coordinate, and evaluate work activities. Ability to write and speak effectively. Ability to develop and maintain cooperative working relationships.

In addition to the GIS program manager, the enterprise GIS will need the support of an analyst programmer to provide both technical support and in-house technical expertise. As assigned by the GIS program manager, this person may develop technical specifications and Web-based and desktop applications and provide training and support to end users, as well as other related duties. The GIS program manager should conduct the search for this employee, and the GIS Committee should validate the appointment.

GIS Committee

An interlocal agreement has established the GIS Committee. This Committee represents the prime data developers in the City, County, State, and private utility companies. Because the composition of the Committee has been well planned, it is not anticipated that it will change. This Committee will continue to provide strategic and management direction to the GIS program.

GIS Technical Committee

The GIS Committee established under Resolution 79704 has a definitive composition. In addition to this GIS Committee, additional technical guidance is necessary to provide a complete perspective on new technology implementations and to ensure that the needs of GIS power users are satisfied.

Each GIS Committee member should nominate a representative to serve on a GIS Technical Committee. The GIS Committee at large will validate this nomination.

The Technical Committee will provide research in new technologies and will test new implementations. The Committee will also be a major contributor to the database design and implementation.

Information Services Division

The interlocal agreement between the City and County establishes a joint Information Services Division (ISD) that provides support to divisions in both organizations. While individual departments may have local information technology support, this division provides the overall architecture for information technology in the City and County. ISD is and will continue to be responsible for data and application servers, networking, and desktop support.

Consortium Participants

The GIS Committee is composed of those key participants who create and maintain enterprise geospatial data sets and share those data sets with the other participants. A number of other stakeholders also have a vested interest in the development and maintenance of the GIS program. These might include the City of Lincoln Police, the Lincoln Airport Authority, and Lincoln Public Schools.

Parties outside the representation of the Committee will have the opportunity to participate in the enterprise GIS program through commitment to a regional Consortium. This commitment will include financial contributions in exchange for use of data and applications. Consortium members will have an informal influence over the GIS Program objectives but no voting rights in the GIS Committee.

Data and Services Subscribers

Although current State statute does not allow for cost recovery on data development and maintenance, pending legislation strongly indicates that will change. It is hoped that, in the near term, Lincoln and Lancaster County will be able to charge for data access to those parties who are not formal Committee or Consortium members.

Very specific skills will be developed in the GIS Program Management Office and the Information Services Division. These skills will be used to develop GIS applications for desktop and Web-based use. Subscribers to the GIS data may also pay additional fees to the GIS program for application development services.

Funding and Cost Allocations

Funding and cost allocations will be defined by commitments made in interlocal agreements, consortium agreements, and subscription services. Funding and cost allocations may consider labor resources allocated to the enterprise GIS program. However, at the onset, all parties to the interlocal agreement will contribute equal amounts of financing. During the initiation phase, the GIS Committee and the program manager should also investigate grant opportunities such as those available through the National Spatial Data Infrastructure (NSDI).

Policies

During the initiation phase, policies will be developed that address data access, use of enterprise data, and tracking of project-based data. A more detailed discussion of potential policy areas is presented in Section 8.

5.1.2 Database Design

The development of a database design and implementation of a GIS database are critical elements in the success of the City of Lincoln/Lancaster County's GIS program. Currently, spatial data resides in a number of file formats and is mostly organized on a project basis.

A key element in the conceptual GIS repository design is the identification and management of the common data elements, which the proposed GIS applications will share. These elements will in part be drawn from existing data management systems and in part will be developed specifically for the GIS program.

> Note that while a database design is outside the scope of this planning project, some recommendations can be made based upon input of the GIS users that is documented in previous sections of this document. This will be defined more completely after focus sessions.

The following actions should be taken to develop the GIS repository:

- Develop a **GIS Repository Database Design**. This design should accommodate the data and application requirements that were identified in Section 3 of this document.
- Develop and implement **data quality and maintenance standards** for data elements included in the GIS repository. Identify roles and responsibilities for the maintenance of each feature set.
- **Migrate existing GIS data** into the GIS repository.
- Develop a consolidated geospatial representation of the **City and County infrastructure**.

5.2 ENTERPRISE GIS IMPLEMENTATION

During the initiation phase, the City of Lincoln/Lancaster County will develop a GIS organizational structure and design the spatial repository that will support that program. During the implementation phase, the emphasis will shift to data and applications development and further definition of roles and responsibilities.

5.2.1 Program Organization

The administrative focus during the implementation phase has several distinct activities—ongoing staff augmentation and development, staff training, and collaboration with external parties.

During the implementation phase, the City of Lincoln, Lancaster County and other regional participants will be focused on developing data and applications. Both are extremely labor-intensive and will require additional staff support. This support should be provided through the allocation of City and County staff to specific data and application development efforts. In order to support the data and application development necessary for the program, the City and County will need to focus on several critical efforts during the implementation phase.

These efforts include the following:

- Develop existing staff. Numerous staff members have a solid understanding of the City and County business practices, as well as a broad capacity for developing technical skills. Additional training for these staff and the ability to work with hired consultants will extend the GIS capacity for the enterprise.

- The alternative to expanding City staff is to outsource application development. One approach would be to establish blanket contracts with implementation firms or software vendors and apply task orders to the blanket contracts. The task orders would define application and data requirements. This approach has a great deal of flexibility but may have some disadvantages in terms of scope management and control. If a "blanket contract" approach is taken, PlanGraphics recommends that at least two additional vendors be utilized. One vendor should specialize in data development and conversion. The other should have expertise in ESRI implementations with an Oracle database.

With either scenario, the GIS program manager, with input from the GIS committee, should manage the additional labor.

Staff training will be a necessary program element in the implementation and operations phases. Development of a certified ESRI trainer in the implementation phase will provide the necessary resource to support GIS users. This position is not anticipated to be a full-time position except in the early portion of the implementation phase. The strong technical skills developed in this individual may potentially be used to support application development.

During the transition phase, the primary interest was to develop formalized agreements between City and County agencies that would enable data sharing and support interaction with staff. As the City enters the implementation phase, the organizational structure that was created for City and County GIS participation can be leveraged and applied to other local governmental entities and private partners.

5.2.2 Hardware and Software

Although existing hardware and software are adequate for the initiation, additional purchases will need to be made during the implementation phase. Software upgrades and purchases will be a key focus. These purchases should be done in tandem with general information technology purchases and maintenance.

5.2.3 Application Development and Integration

The City's needed geospatial applications are listed below with priorities assigned from input by City staff. These applications fall into seven project areas:

- ArcIMS enhancements
- Project tracking and mapping tools
- Data enhancements
- GIS integration
- Facilities management
- Field-based computing.

The application priorities have been classified as highly important (High), highly to moderately important (High-Mod), or moderately important (Moderate). In general, this prioritization should be used to establish when each application should be developed. These applications include the following:

- **ArcIMS Enhancements** – PlanGraphics recommends continued support, upgrade, and expansion of the ArcIMS applications as the basic viewing tool. Enhancements include expanding data sets served through the viewer and providing a user guide.

- **Project Tracking and Mapping** – Another priority use of GIS is the ability to access maps, data tracking capital improvement projects (CIPs), and private development projects.

- **Geographic Index to EDMS –** A related priority is the development of a geographic index to scanned documents that are stored on shared drives. PlanGraphics recommends developing the index as part of an electronic document management system.

- **Thematic Mapping –** A number of different departments need to be able to make their own maps, particularly thematic maps for internal and external use, and to provide the maps electronically and at public meetings.

- **Field-based Computing** – Currently, GIS and other spatial technology uses are primarily confined to the office. The impact of data and technology investments could be maximized through field-based computing solutions deployed to field personnel.

- **Access to a GIS Data Dictionary** – Several current and potential users of GIS expressed a need to determine what data is available, how it was developed, data maintenance information, and how to access this information. Currently, this information is fragmented and difficult to locate. A GIS data dictionary would provide a resource for users to determine the sources and suitability of data for their needs.

5.2.4 Database Design and Development

Development of a database design is to be accomplished during the initiation phase. By the implementation phase, database development will focus on establishing data creation and maintenance procedures that will support the GIS.

Because of the diverse sources from which spatial databases are built, it is extremely important to maintain information about the content, quality, source, projections, coordinate systems, and lineage (history of use and changes) of data. Considerable activity has occurred in the development of metadatabases—tabular databases that hold information about spatial databases to—a) support queries about the availability of data, b) support decisions on the suitability of data for a particular application, and c) support programs for data maintenance.

A metadatabase is like an automated "card catalog" that serves as a director to spatial data and provides users with information about how to access and use spatial data. A well-designed and well-maintained metadatabase provides a basis for more effective use and long-term viability of spatial data being maintained by an organization. This metadatabase will allow the City to keep the data dictionary current and complete.

5.3 ENTERPRISE GIS OPERATIONS

By approximately Year 5 of the City of Lincoln/Lancaster County's Enterprise GIS development, it will enter into the operational phase of the program. A well-established organizational structure and staffing will be in place. The repository will be complete, and data maintenance procedures will be developed. And finally, applications and integrations will be complete and tested.

During the operational phase, the City and County should again consider its business practices and organizational requirements for spatial technologies. During that review, the *GIS Master Plan* should be updated to reflect current business priorities and best practices in technology.

SECTION 6
RISK MITIGATION

Many of the departments participating in the project have an appreciation for both the potential benefits and barriers for implementing an enterprise GIS. These benefits and barriers are indicators of potential areas of risk to the program. This section describes some of the potential benefits of a system and discusses current risks to the enterprise GIS.

6.1 IMPORTANCE OF GEOGRAPHIC INFORMATION

This report has documented the importance of geographic information to the City/County departments, potential applications for GIS, and activities that involve the collection, use, analysis, and distribution of maps and geographic information. Some of the hundreds of hours now spent on these activities can be reduced and used to perform activities that support more effective operation and management.

In meetings with participating departments, discussion centered around anticipated benefits that can result from the implementation of an Enterprise GIS. The level of the anticipated benefits is the critical issue in deciding priorities for developing specific applications. Types of benefits that were determined to be important to the various departments follow:

- Sharing information and providing better services to the public
- Creating easier and faster access to data
- Performing faster updates
- Creating custom maps in a more timely manner
- Producing high digital quality maps and export formats
- Creating custom maps based on necessary/select data or scale
- Supporting connectivity to the City/County network
- Reducing redundant data entry and possibilities of errors
- Linking different systems through a common system
- Creating a central repository of core GIS data for access by all departments
- Accessing and integrating external data.

6.2 RISKS AND MITIGATION STRATEGIES

The benefits described above are just a sampling of the potential benefits realized through a GIS. To achieve these benefits, existing technical, political, and organizational barriers need to be overcome. This project must address these barriers if GIS development is to move forward.

Some issues and concerns have to be addressed prior to full GIS implementation. These issues affect the fundamental base of the GIS and reflect the decisions behind the support and structure.

6.2.1 Data Reconciliation and Integration

Of much concern is the current status of data, particularly address accuracy, digital base map information, and utility maps. Some departments reported that attribute data are not electronically based or in proprietary formats that may require special conversion or extraction programs. Integrating data from various departments and individual systems is always of concern. Of special concern is the amount of utility data stored in MicroStation format and the challenge of transferring this data to the geodatabase format, including annotation. Another concern is the number of disparate databases that the departments currently utilize and integrating all of these into one system, if appropriate.

6.2.2 Data Accuracy and Integrity

Several departments expressed concern over data accuracy and integrity. Concerns were expressed over who will be in charge of maintaining the data and ensuring its level of accuracy. Concerns were also stated about the same type of data stored in different databases not containing the same information, currency, or level of detail and the process of reconciling these differences. Lastly, concerns were expressed about the level of precision that can be obtained using ESRI's geodatabase format.

6.2.3 Data Entry

Many of the departments issued concerns about data entry. These concerns were two-fold—1) initial entry, and 2) updates to the Enterprise GIS. Departments communicated concerns on how both digital and hardcopy initial data entry would be accomplished, including determining the correct source for the data as many departments have the same data source but have modified it for their specific use, the amount of time to enter hardcopy data that the departments currently utilize, and the amount of time to link digital data with data in the Enterprise GIS where no ties currently exist between the data set and the base information. The second concern was the updating of the GIS data, determining who was responsible for that task, and the process of how that updating would be accomplished.

6.2.4 Data Security

Security issues and the sensitivity of specific data were mentioned in a number of the department interviews. Policy will need to be established regarding what types of data are made "readily" available, especially to the general public.

6.2.5 Departmental Access

The issue of access to the base map and all applications must be considered. Policies on who can access or change specific records on an ongoing basis will need to be determined. Privileges and security concerns for who gets what information when should be discussed in future meetings. Naturally, all participants will require a certain level of access to the GIS, and all issues of access will be determined accordingly by the participating departments. Additionally, many departments have expressed a desire to obtain current information while in the field. Lastly, access to a printer to print color or large-format maps is a necessity for departments utilizing the Enterprise GIS.

6.2.6 Coordination with and between the City, County, and Outside Agencies

Many of the departments expressed an interest in obtaining and sharing data between departments in the City and County, as well as some outside agencies. The interlocal agreements that the City and County have established would work well for this type of access. Integrating information from these entities into the Enterprise GIS will benefit departmental activities.

6.2.7 Sufficient Staffing

A great deal of concern was expressed by most departments about sufficient staffing to perform duties and to provide support for GIS implementation, including data collection, data entry, quality of data, and maintenance. Without proper staffing and support, City/County employees feel that this implementation will not be successful and adopted at a level that will benefit all potential users.

6.2.8 Training

Also expressed was the concern over the number of staff who are trained and knowledgeable in the use of computers, networks, and GIS applications. This is especially true for new software systems. Overall, computer literacy within the City/County departments is fairly high, and the City/County does not anticipate any user limitations provided adequate hardware is available to run the new system. The most prevalent issue raised by numerous departments is the lack of resources or time to properly learn to use the system. To enable the full potential of an integrated GIS system, adequate support and training would be required.

Another issue is the provision of adequate training to technical resources responsible for developing the databases and applications. Current resources in Information Services have done an excellent job of developing the existing ArcIMS applications. As functionality is added to these applications, they may need to be rewritten using Java or ASP. Current or future staff assigned to these programmatic responsibilities will need adequate training and sufficient time allotted to their “learning curve.”

6.2.9 Systems Maintenance and Management

If a multi-departmental GIS is to be implemented, a commitment will be required of support staff and users toward the management and maintenance of the GIS and its data, hardware, and software. The departments questioned who would be in charge of running the Enterprise GIS and if guidelines would be established for its management.

6.3 RISK MITIGATION

The identification of potential barriers is a strong indicator of the areas of risk to the development of an enterprise GIS program. This section describes those areas of risk and suggests methods for mitigating that risk.

Risk 1: Ineffective Organizational Structure

One of the larger risks to the development of the enterprise GIS program is the potential that the organizational structure is not effective in implementing the plan and developing the program. This risk can be mitigated through the following tactics:

- Create central responsibility early in the initiation phase.
- Locate the Program Management Office in a department that represents both City and County interests.
- Clearly define roles and responsibilities. This includes establishing accountability.

Risk 2: Ongoing Data Redundancies

A second risk to the program is that cost avoidance is not realized due to ongoing data redundancies and duplicate workflows. This risk can be mitigated through continued re-engineering of those duplicated workflows. Mitigation of this risk has already begun as the County engineer and City Public Works and Utilities have conducted sessions to identify new processes for land base development.

Risk 3: Lack of Executive Support

A third risk to the GIS program is a lack of executive support. This would result primarily from a lack of understanding of the programmatic needs of GIS and the benefits realized. This lack of executive support may result in insufficient funding to support the program. To mitigate this risk, executives in the City and County need to be educated and informed about the benefits and uses of GIS. Mitigation of this risk has already begun through presentations by both the GIS Committee and PlanGraphics.

Risk 4: Needs of the Staff are not Met

Even if there are many successes in developing the enterprise GIS program, it will not realize maximum benefits if the technology needs of the staff are not met. This may occur through a lack of technical support or training. This risk should be mitigated through the development of a help desk function in the Program Management Office and the establishment of a training program.

SECTION 7
BUSINESS CASE SUMMARY

7.1 INTRODUCTION

The justification of geospatial expenditures, particularly for enterprise projects that encompass multiple agencies spanning more than one jurisdiction, can be exceedingly difficult, and standard economic analysis tools, such as the Return on Investment (ROI) measure, are not at all well suited for validating these types of multi-faceted project investments. Development of a solid business case can provide a far more valuable and useful explanation to help inform expenditure decision-making.

7.2 PROBLEMS WITH STANDARD ECONOMIC MEASURES LIKE ROI

A number of problems are commonly recognized with the application of measures like ROI. First, ROI only provides the user with a percentage score, and it does not address the magnitude of the return that might be received. For example, one small project may produce an ROI of 200 percent but yield only an investment savings of a few hundred dollars. A much larger project may have an ROI of just 15 percent, but because of its magnitude, it could save tens of thousand of dollars. A direct comparison of just the ROI percentages would argue for the smaller project with the higher ROI percentage, although its overall economic benefit is much less.

Geospatial technology projects are like other information technology projects that typically have high front-end investment requirements that do not produce payback returns or benefits until later in the project life cycle. To conduct an equivalent comparison on investment options, discounting must be used to bring all costs and benefits back to present values, and decisions on the time period and the discount rate to use in the calculation must be made and accepted. Unfortunately, most simple ROI metrics disregard the time value of money.

The costs and benefits to include in an ROI calculation must also be agreed to by all parties that will use the results, and ROI usually does a poor job of capturing economic components that are hard to quantify, like productivity gains and avoided costs, and non-economic strategic objectives like enhanced government image or improved responsiveness to citizen needs and problems. The inability to quantify these decision factors creates uncertainty in the validity of straight ROI evaluations, not to mention the absence of information on risks and the actual steps required to produce the return.

On the whole, reliance on a single evaluation factor such as ROI does not provide sufficient detailed input for decision makers to reach an informed conclusion and choice.

7.3 GENERALIZED BUSINESS CASE PREPARATION

IT planning literature is replete with business case methodologies and case studies, but most are specific to a particular hardware platform or business problem and seldom encompass complex organizational situations like the one that exists in Lincoln and Lancaster County. The following abbreviated outline of steps presents the key components of a business case that could be used to generally justify geospatial activities and related expenditures in Lincoln and Lancaster County.

Step 1: The first step in developing a business case is to explain the business need and the business objectives that will be addressed by the proposed action. There is a tendency to try to describe need quantitatively, but geospatial needs often go well beyond things that can be measured numerically. For instance, although it might be possible to estimate time savings associated with improved working relationships, the true value of an improved sense of openness and cooperation cannot be measured directly.

Step 2: The second step is to fully describe the proposal that is being offered to address the business requirement. This involves listing the detailed tasks and identifying, and to the extent feasible, quantifying all of the resources that will be needed, including hardware, software, new personnel, and time diverted from other projects for existing staff, outside consultants, etc.

Step 3: Preparation of a project budget or cost model is the third step in building the geospatial business case. The budget should be complete and not exclude any relevant costs that can be reasonably anticipated, and it should separate on-time or non-recurring costs from ongoing or recurring costs. Sources of funding should be identified, and the timing of resource needs should be stated. In addition to direct costs, support costs such as IT assistance and resources should be included in the budget.

Step 4: A description of the anticipated benefits and the value that will result from using the geospatial technology product or action is developed in Step 4. Benefits typically accrue in three main areas—1) cost reduction (hard cash savings), 2) cost avoidance (costs that are deferred), and 3) strategic benefits. Some benefits will be quantifiable; in other words, they can be stated in terms of fewer hours of work or actual dollars saved. Others will be intangible and cannot be quantified in monetary terms. These benefits are, nevertheless, important, and should be described qualitatively.

[Note: The Geospatial Information & Technology Association (GITA, formerly AM/FM International) and the American Water Works Association Research Foundation (AWWARF) are currently conducting a project to establish a GIS investment guide that should be available in 2005. The guide should include monetary estimates of the advantages of GIS projects.]

Step 5: Projected cash flows for the actual costs and benefits are developed in this step, and costs are especially important because they cannot exceed available or budgeted funds. Financial metrics are also selected to analyze the projections in this step, and while ROI may be one of the metrics, better choices are probably cost-effectiveness, payback or break-even period, and net present value, which discount cash flow to current dollars. Making a comparison in current dollars is essential because, when conducting economic analyses, money is worth more today than it is in the future.

Step 6: A key difference between calculating a simple ROI and preparing a business case is that ROI does not inherently consider the risks and uncertainties associated with an investment choice. The ROI percentage is only an indication of the outcome if everything goes as planned, but seldom does that happen in IT and geospatial projects. Delays, unexpected problems, and other unreasonable assumptions are frequently encountered, and the risk factors that must be managed for the project to be successful should be clearly articulated in the business case. Further advantages of identifying risks and uncertainties include providing a guide on the events and actions that need to be closely monitored during implementation and creating credibility with decision makers by acknowledging that things could go wrong.

Step 7: The final step in preparing a business case is to state conclusions and offer recommendations that are practically grounded based on the assumptions about the project. Recommendations may include variations or alternatives that might be pursued if certain risk factors arise. The recommendations should also include the specific activities that will be carried out to achieve implementation of the geospatial project.

SECTION 8
GIS POLICIES

This section discusses policy areas to be developed for the LLC Enterprise GIS Program.

8.1 DATA STEWARDSHIP

Geographic data stewardship encompasses all aspects of an effective program for data management, maintenance and making data available to users. This report provides a context for an effective policy and procedural environment to maintain high-quality geographic data and to make this data available to users.

The Lincoln/Lancaster County GIS program is an enterprise effort that will include users and data providers from many organizations. Potentially, all organizations and groups participating in the GIS program could be in a position to provide or update geographic data and, therefore, may have a lead or supporting role as a data steward. Typically there are four main roles:

1. Provide Source Material or Data
2. Actively Update Data
3. Participate in Quality Checking
4. Data User.

In the initial phases of implementation, the GIS program manager will need to establish data stewardship roles for each of the data sets that will comprise the enterprise GIS. In some cases, more than one organization may be responsible for each of the roles with one organization having a primary role while others have a secondary role. The designations should allow some flexibility, but care should be taken to make sure roles are clearly defined.

8.1.1 Basic Principles

In addition to establishing data stewardship, the GIS program manager will also need to define basic principles of data stewardship. These principles will define responsibilities for data stewardship. Best practices for geographic data stewardship that may be useful in defining Lincoln/Lancaster basic principles follow:

1. Geographic data is a valuable asset that supports the business needs of users. Its value should be maintained over time through an effective, efficient update program.

2. Organizations with missions encompassing geographic data collection should have a lead role in providing and updating that geographic data for the Enterprise GIS.

3. The processes supporting geographic data stewardship will be based on a clear, inclusive, and well-documented data architecture.

4. Policies, procedures, and technical processes for data update should be well documented and widely communicated.

5. Metadata providing information about the content, format, quality, authority, and availability of geographic data is vital, and this metadata should be updated along with the data itself.

6. Geographic data quality is critical—data should be maintained at the specified quality level. That quality level should be met unless there is a good reason to deviate and deviations are documented.

7. Geographic data should be shared widely among the full user community with proper consideration to legal and policy concerns that may restrict access and distribution.

8. Users are responsible for obtaining software that is compatible for using the GIS enterprise data in native format.

8.1.2 Best Practices

To assist in developing data stewardship policies and procedures, PlanGraphics has compiled a list of best practices based on other GIS programs. The best practices are organized into the four categories explained below:

1. Database Organization and Design: Includes practices that call for sound, effective approaches for enterprise data modeling, physical database design, and establishing specifications and standards for data format and quality.

2. Database Processes: Defines workflows, procedures, and tools for effective and efficient database conversion, maintenance, quality assurance, and maintenance tracking.

3. Organizational Structure and Responsibility: Establishment of organizational responsibilities for database maintenance and the organizational elements to support ongoing maintenance.

4. Database Administration and Accessibility: Practices and policies for ongoing database administration and security and for making GIS data accessible to users.

Table 8-1 summarizes best practices under each of the four categories.

Most of these best practices relate to data maintenance—ongoing update and administration of the GIS enterprise database after the data has been captured. This is the principal focus of the concept of data "stewardship." However, recognizing that a part of implementing the enterprise GIS will include database development efforts for data themes not yet populated, several best practices address this data conversion activity.

Table 8-1: Summary of Best Practices for Data Stewardship

A. Database Organization and Design
A.1: Base Design on Enterprise Architecture
A.2: Develop and Maintain Enterprise Data Model
A.3: Define/Maintain Data Format, Content, Quality Standards
A.4: Identify Volatility, Trigger, and Source for All Data Update
A.5: Define Data Format Rules
A.6: Design Standards-based Metadata
A.7: Define Mapping Rules to Support Conversion and Update
A.8: Design GIS Databases to Support External Integration
A.9: Establish and Employ an Approach for Temporal Data Management
A.10: Have Process for Submittal and Execution of Database Design Changes
B. Database Processes
B1: Prepare a Long-term Operational Plan for Data Conversion
B2: Establish Project Management Procedures for Data Conversion
B3: Define and Document Workflows for Update Processes
B4: Acquire/Build Effective Tools for Database Update and QC
B5: Set up and Follow Procedures for Database Update during Conversion Projects
B6: Set up an Effective Process for Submittal of Updates
B7: Set up a Process and Tools for Final QA and Posting
B8: Acquire Updated Data from Commercial Source
C. Organizational Responsibilities and Resources
C1: Organize and Sustain an Active Enterprise Data Implementation Team
C2: Assign a Formal Data Standards Body
C3: Assign Project Teams and Management for Data Conversion
C4: Establish Formal Agreements with GIS Participants
C5: Assign Formal Organizational Responsibilities for Data Stewardship
C6: Assign Resources for GIS Database Administration
D. Database Administration and Accessibility
D1: Establish and Track Data Security and Access
D2: Establish Database Back-up and Recovery Procedures
D3: Track Database Changes and Notify Users
D4: Establish, Monitor, and Respond to Legal Impacts on Data Access
D5: Set up a Process and Mechanism for Data Export (?)
D6: Provide Technical Support to Users

8.2 RESOURCE ALLOCATION

In the course of implementing the enterprise GIS, participants will face many challenges. One of these challenges will be the allocation of resources, including funding and staff. PlanGraphics recommends the creation of policies and procedures that will guide the use of resources in all three phases of the project. The following is a summary of the recommendations:

Initial Phase

- Refine project goals and detailed work plan
- Define GIS Program Management Office responsibilities
- Define staff positions and roles
- Develop a procedure for tracking and making modifications to the project goals and work plan
- Develop a procedure for tracking staff time and making modifications to assignments

Implementation

- Implement policies and procedures for monitoring project status reports and the budget
- Implement staff time tracking systems and project codes
- Monitor GIS implementation status and budget
- Develop procedures request for non-core GIS data or application development

Operations

- Redefine GIS project goals
- Redefine GIS staff responsibilities

APPENDIX A
VISIONING TECHNICAL MEMORANDUM

CITY OF LINCOLN/LANCASTER COUNTY
GIS VISIONING REVIEW
TECHNICAL MEMORANDUM

Submitted to:

LLC GIS Committee, GIS Master Plan Project Team

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SECTION 1
BACKGROUND AND PURPOSE OF MEMORANDUM

In October 2003, the GIS Committee and other key City and County GIS users participated in a GIS Visioning Workshop facilitated by Environmental Systems Research Institute (ESRI). The purpose of this workshop was to develop a vision for GIS development that would result in an enterprise approach to GIS. From this workshop came the following recommendations:

1. Formalize the GIS implementation.

2. Create a more structured GIS organization.

3. Further refine the Vision Statement: "Connecting More than the Dots."

4. Initiate and implement the following major application and core database development efforts:

    a. Develop a *GIS Master Plan*
    b. Unify the development of land base data
    c. Inventory infrastructure and develop database
    d. Formalize a process for workflow management
    e. Improve GAS and CAD (Computer Aided Design) integration
    f. Establish a GIS training program for continuing education.

5. Incrementally develop "quick-win" GIS applications.

Subsequent to the Visioning Workshop, the GIS Committee took action on several of these recommendations. This was done through the initiation of two projects—1) a technology migration strategy project with ESRI, and 2) a *GIS Master Plan* development project with PlanGraphics.

The technology migration strategy project was conducted first. During this project, geospatial resources and uses were captured (more info – look at strategy document).

After the migration strategy was developed, the GIS master planning process began. Initial tasks in the master planning project included the review of work done to date, development of questionnaires to collect additional data, and an assessment of whether the recommendations of the *Visioning Report* were still valid and should be implemented against. From that work, the *GIS Master Plan* will be developed. This technical memorandum compares the existing conditions and sentiments in the participating agencies with the enterprise vision as previously presented and answers the following question:

"Does the current Enterprise GIS development make sense?"

This document has been organized into several sections in order to answer that question. Section 1, Introduction, provides the project background and a purpose for the memorandum. Section 2 reviews each of the recommendations. Finally, Section 3 provides a summary of issues critical to the implementation of the enterprise GIS.

SECTION 2
EVALUATION OF THE VISIONING REPORT

In this section of the Technical Memorandum, PlanGraphics evaluates the recommendations of the visioning report to answer the following questions posed by the project team:

> Based on the current *Enterprise GIS Vision* document, is the model proposed still feasible? Is it up-to-date? What departments supported the vision? Which didn't? What is the status of some of the major developments? Does a formal data warehouse exist?

Each recommendation is reviewed below.

FORMALIZE GIS IMPLEMENTATION

All master planning project participants indicated a need for a more structured approach to GIS that would allow them to receive increased benefits. Most of the agencies participating in the project are currently using GIS or other spatial technologies routinely in the performance of their jobs. While they have already seen the positive impacts on work performance that GIS can have, a more formalized and enterprise approach is necessary.

Some of the primary objectives in formalizing an enterprise GIS implementation include:

- Development of GIS standards
- Development of metadata
- Allows agencies to anticipate, plan for, and execute upward migration of technology, i.e., AMLs and Avenue scripts
- Supports cost-effective purchasing
- Provides help desk and technical support to end users at all skill levels
- Streamlines workflows
- Encourages collaboration and efficiencies
- Supports end-user training
- Definition of roles and responsibilities

- Identification of funding and other resources
- Creation of an executive-level understanding of GIS and financial support for the program.

Although a more structured approach is desired, some departments expressed concern that the structure not be too centralized or rigid. Several were quite firm in their belief that the enterprise GIS should not become a centralized department but should remain collaborative with a more coordinated approach.

CREATE A MORE STRUCTURED GIS ORGANIZATION

Opinions varied widely on how the enterprise GIS should be structured. However, nearly all felt that there is a compelling need for centralized management that would support the GIS implementation. Because of the "islands of GIS" that currently exist, the new approach should be an organic structure that pulls people together.

Participants agreed on the need to have a coordinator who would provide leadership and guidance to the program. A committee should guide the work performed by this coordinator. Some felt the existing committee should be expanded to be more inclusive and that the expanded committee would provide that guidance. Participants strongly indicated that technical committees should be established to support the guidance committee and the GIS coordinator.

Overall, most participants felt that a more structured GIS organization needs to be formed. However, several groups expressed strong resistance to the creation of a centralized GIS department. The new structure should take fuller advantage of existing intergovernmental agreements and should initiate others as necessary. Overall management of GIS should be City/County neutral. Therefore, the GIS Coordinator and any staff supporting that coordinator should be accountable to the committee, not to a city or county department.

The coordinator and any other staffing assigned by the committee should provide technical support to end users at all levels. This includes help desk support, mentoring, and other technical assistance. They should also facilitate software and application training.

Funding was a key concern in developing a more structured GIS organization. Overall, City staff felt that they would have a difficult time justifying additional costs to executive management, whereas County departments thought that they could rally support and obtain additional financing where necessary.

FURTHER REFINE THE VISION STATEMENT: "CONNECTING MORE THAN THE DOTS"

The *Visioning Report* suggests that the vision statement may require refinement as the enterprise GIS implementation develops. None of the *Master Plan* project participants indicated the need to change the vision statement at this time. However, the vision statement was not commonly verbalized during interviews and may not yet be associated with GIS program development. As marketing for the GIS program develops, the vision statement should be incorporated to illustrate to governmental executives the value of GIS.

INITIATE AND IMPLEMENT SEVERAL MAJOR GIS PROGRAM COMPONENTS

Develop a GIS Master Plan

This technical memorandum is part of the *GIS Master Plan* project. Interview participants were enthusiastic about the project and anxious for a *Master Plan* to be developed.

Unify the Development of Land Base Data

The development of land base data was a critical issue for most of the master planning participants. However, issues varied from department to department, and complete unification of the land base data poses some challenges. Land base data is developed by several different agencies in the City and the County. The County Engineer and Assessor have developed much of the land base as survey grade data. However, this development is laborious and incomplete. As a result, other departments, such as Public Works, have developed other land base sets to give them a fabric on which to map infrastructure.

The majority of City GIS users are in fact that – users of the data. In general, most users only require mapping grade data. They also need GIS functions and capabilities provided by current releases of ArcGIS. A strong overall sense exists that migration to the geodatabase is needed for the enterprise land base.

This poses concerns for the County Engineer, Assessor and others. The current version of ArcGIS does not support the data precision that has been created by the County Engineer with previous versions of ArcInfo. Therefore, concerns exist that land base accuracy will be degraded by migrating it completely to the geodatabase. It will be necessary to utilize ESRI's Survey Analyst in order to maintain the land base with the current precision. This poses its own concerns due to the complexity of the software and the resultant need for training in the product.

Despite these challenges, unified land base development was expressed as an overwhelming need. Users find it difficult to identify which spatial data set to use. Data currency is also a critical issue. Refining the workflows associated with land base development and maintenance will be a critical implementation task.

Inventory Infrastructure and Develop Database

Some participants felt that not all GIS users were willing to share their data. However, no participants expressed any reluctance to share data except where security is an issue. The disconnect appears to be in the vast quantities of undocumented data and lack of formal rules for posting and sharing data.

Database development for enterprise data is still a critical implementation issue for the enterprise GIS. As part of the technology migration strategy project, ESRI catalogued data sets used by numerous City and County departments. PlanGraphics expanded that project during its surveys, and the results were loaded into an Access database. The results of these two efforts should be used as a starting point for database design and development during implementation.

Formalize a Process for Workflow Management

Several intergovernmental or interdepartmental workflows require streamlining. The most obvious is the development and maintenance of land base data. Another is the assignment of addressing to geospatial features, i.e., points and centerlines.

While participants did not verbalize a need for a formal process for workflow management during the interviews, it would still be beneficial to have standard procedures to guide the City and County through the re-engineering process.

Improve GIS and CAD (Computer Aided Design) Integration

The need for enhanced GIS and CAD integration continues to be a critical implementation issue. Streamlining data maintenance procedures and the plat review process will rely on digital submission standards that result in GIS-ready data. Digital submission standards have been drafted and are being refined. Finalizing these standards is a critical issue, particularly for Planning. The use of GIS and CAD tools also needs to be defined, particularly in Public Works where MicroStation is used primarily for GIS functions.

Enhancing the integration of GIS and CAD is also a critical issue in the development of a unified land base management approach. By retaining and integrating the more precise MicroStation with geodatabase development, all users can experience the benefits desired.

Establish a GIS Training Program for Continuing Education

Universally, participants identified the need for a GIS training program. Most of the users are self-taught. The one definitive exception to this is the Police Department where industry specific training is provided to officers as part of other training efforts.

INCREMENTALLY DEVELOP "QUICK-WIN" APPLICATIONS

Master planning participants identified numerous applications currently in use and to be developed in the future. These applications are being documented and described in the *Master Plan*. The *Master Plan* will also describe the recommended prioritization of application development during implementation. This will provide the incremental development recommended by the *Visioning Report*.

SECTION 3
SUMMARY AND RECOMMENDATIONS

The City of Lincoln and Lancaster County departments have a longstanding tradition of collaborating and working together. Consistently, they, as well as other participants, support the vision for an enterprise GIS. Their combined views on how that vision should be implemented have resulted in the following recommendations. These recommendations have been formulated to answer questions posed by the *Master Planning RFP*.

RECOMMENDATION 1: CREATE A GIS PROGRAM MANAGEMENT OFFICE

There are as many ways to implement an effective GIS program as there are organizations that are implementing GIS technology. The development of a multi-participant enterprise GIS program generally consists of several key structural components. These include:

- Binding agreements between parties which define commitments
- Creation or assignment of staff to a centralized management and support team
- Location of that team in one of the member organizations for administrative support.

At the City of Lincoln/Lancaster County, all master planning participants strongly expressed the need for a GIS coordinator who would act on the direction provided by the GIS Committee. Everyone had very large expectations for what this role would provide.

The successful implementation of an enterprise GIS program requires that numerous GIS projects be conducted simultaneously. Some of those projects may have interdependencies. The GIS program coordinator should identify teams for the projects, monitor the progress of the teams, manage the interdependencies, and participate in project teams.

In addition to direct implementation support, master-planning participants identified other key areas that need to have centralized management and support. A training plan needs to be developed and implemented. Help desk support should be provided. This individual would also handle management of GIS funds.

Because the roles identified were broad, it is unrealistic for one person to effectively guide the implementation strategy being designed in the *Master Plan*. We are not recommending that a GIS Department be created. Rather, we are recommending that the GIS Committee create a GIS Program Management Office. The GIS Program Management Office would be headed by a GIS coordinator and may include a technical resource to support the overall program. This approach will provide neutral and

centralized coordination for the GIS program. However, it will be limited to only those few resources that are required for that coordination and collaboration.

After further discussion, the general consensus was to create a GIS Management Office in Planning. One full-time position should be allocated to hire a GIS coordinator. Interlocal agreements should be used to establish participation, roles and responsibilities, and cost sharing. Additional staffing will likely be necessary. The GIS coordinator should be hired first by the Committee. This coordinator should be involved in the selection of any additional staff.

RECOMMENDATION 2: EXTEND REACH OF EXISTING GIS COMMITTEE

We recommend that the standing GIS Committee explore ways to extend its reach to other city and county departments. The Committee is currently comprised of the agencies who have been the primary data creators and implementors of the present GIS program. While we believe this Committee ought to remain the near-term administrative focus of the program, the Committee should research additional means for involving other city and county departments in the continuing evolution of the City-County GIS program.

One means to consider is potentially expanding the GIS Committee's membership to include departments that elect to take a more active role in creating and maintaining commonly accessed databases, in sharing in the cost of the program, in enhancing their technical proficiency in GIS, and in furthering their department's overall use of GIS in day-to-day operations.

Another way of extending the GIS Committee is to create a Technical Committee. This Committee would be related to the GIS Committee but would have primarily a technical focus rather than a business focus as decisions are being made.

A third way to increase involvement is through the creation of data and application licensing agreements. Parties that wish to use the data but not necessarily influence the strategic direction of the GIS program can become participants through licensing agreements. This opportunity may rely upon proposed changes in Nebraska law. Continued monitoring of Nebraska Legislative Bills LB490 and LB565 is recommended.

Lastly, an active GIS User Group should be created that supports and educates end users. This would also offer end users a venue to make suggestions that could be taken to the GIS Committee or Technical Committee. The GIS User Group would be guided by the GIS Program Management Office to ensure that topics pertinent to the implementation are being presented – and that the implementation issues of the end users are identified quickly.

Funding is a key concern of many City and County participants. However, blocks of funding have traditionally been set aside for specific GIS endeavors such as acquisition of aerial photography. Funds are annually committed and should continue to be. Following this model, contributions should also be sought from other governmental departments or companies that could benefit from the enterprise GIS. At least one of the participants indicated that they could justify additional funding for GIS program enhancements.

We also recommend that the City grant writer be consulted on potential funding. A number of homeland security grants have included provisions for the development of geospatial data and applications. Lincoln/Lancaster County has a very successful GIS implementation in its Police Department and Sheriff's Office and may not have considered this as a potential revenue stream.

Because we have not recommended the formation of a GIS Department but rather a Program Management Office, we would also suggest that the view of "funding" the program be expanded. While some departments may have difficulty in identifying any more fiscal resources to assign to GIS implementation, they could have one or more of the following resources to commit:

1. Staff time. Labor hours that staff work on enterprise GIS implementation.

2. Space. This could be office space for the Program Management Office, labs for training, or another space where project-specific work could be conducted.

3. Applications/Re-usable code. Several departments have written their own scripts and may be able to contribute re-useable code.

4. Success templates. These could include training documents or intradepartmental procedures that have been successful and can be reused.

5. Equipment. This could include devices such as GPS equipment that may not be used constantly by the owner and can be "rented out" for enterprise use.

All of these resources have a financial value that could be assigned, and budgets could be assigned for these resources just as they are for fiscal resources. For example, the Assessor's office suggested it has a couple of individuals who could work on enterprise data development on a part-time basis. That might result in a budgeting commitment of one FTE for the program. The staff stays in their organizations. Their time is coordinated by the Program Management Office with the department that commits the resource to the Office's "budget."

RECOMMENDATION 3: DEVELOP AND IMPLEMENT A COMMUNICATION/ EDUCATION PLAN

Executive support for the program is key to acquiring any additional funding for the GIS program. Our final recommendation from our review of the *Visioning Report* is that a marketing plan be developed that educates City and County directors about the values of GIS in the business of local government. The *GIS Master Plan* will include an analysis of the Return On Investment. This should be used as an element of the marketing plan. Presentations to local government executives have also been included in the scope of work for the *Master Plan*. However, this will need to be an ongoing responsibility of the owners of the GIS program. As such, the GIS coordinator should manage marketing endeavors in cooperation with the GIS Committee and User Group.